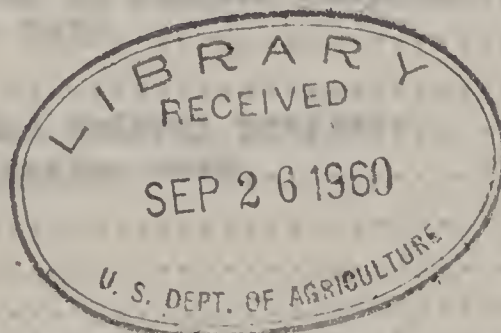


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REPORT OF
COOPERATIVE BLISTER RUST CONTROL WORK
IN THE NORTHEASTERN STATES
DURING 1932



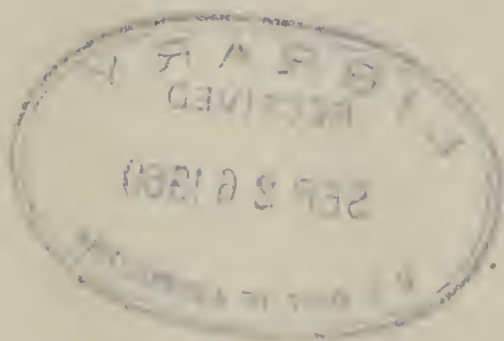
By

E. C. Filler and K. K. Stimson

Boston, Mass.

May 30, 1933.

REPORT OF
COOPERATIVE BLISTER BUST CONTROL WORK
IN THE NORTHEASTERN STATES
DURING 1952



BY
M. C. Miller and E. K. Robinson

Roston, Mass.

May 30, 1953.

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This report is based on a summary of the activities of the various State and Federal agencies, and the general information obtained by the Federal inspectors. It was prepared by the Bureau of Plant Industry, U. S. Department of Agriculture, and is intended to give a general idea of the progress of the work in the various States. It is not intended to give a detailed account of the work in any one State, but to give a general idea of the progress of the work in the various States. It is not intended to give a detailed account of the work in any one State, but to give a general idea of the progress of the work in the various States.

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121-125	Rhode Island
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This report is based on a summarization and analysis of BRC-5 forms submitted by the state leaders, and on observations made by the federal supervisor. It summarizes the control work for all years, and especially gives the details regarding the 1932 activities. No attempt has been made to discuss future plans in this report. Such plans, particularly for 1933, have been prepared for each cooperating state. As these plans have been furnished the state and federal officials, it does not appear advisable to repeat this information.

FORWARD

This report is based on a summarization and analysis of the yearly 1932-3 forms submitted by the state leaders, and on general observations made by the federal supervisor. It summarizes the control work for all years, and especially gives the main facts regarding the 1932 activities. No attempt has been made to discuss future plans in this report. Such plans, particularly for 1933, have been prepared for each cooperating state. As copies of these plans have been furnished the state and federal officers, it does not appear advisable to repeat this information here.

BLISTER RUST CONTROL IN THE NORTHEASTERN STATES

SCOPE OF THE PROBLEM

White Pine

The white pine growth in New England and New York comprises 7,283,399 acres and has a normal commercial value of over 300 million dollars. This acreage is classified as follows: Pure pine (80 per cent or over), 2,714,182 acres; mixed pine (21-79 per cent pine in mixture), 2,791,833 acres; and pine stocking and restocking in other types, 1,777,884 acres. Of the total pine acreage, 75.1 per cent is located in the three States of Maine, New Hampshire, and New York. A similar survey in Pennsylvania and New Jersey revealed a total of 378,978 acres of white pine. In the latter state, the white pine is confined to ornamental and forest plantings and to small scattered areas of natural growth in the northern part of the state. In addition, throughout the Northeastern States, there are vast areas of mixed growth with pine stocking of less than 20 per cent. Also, millions of white pines are being planted each year; as for example, 6,612,100 white pines were distributed from the New York State nurseries in 1932.

Table 1.- Acreage of White Pine in Northeastern States

State	Pure White Pine (80-100% white pine)		Mixed Types Contain- ing White Pine		White Pine (above re- stocking size) in Other Types	White Pine Restocking in all Types Except "Pure Pine Under 6" DBH	Total* (Excluding acreage restocking to pine)
	6" and over DBH	Under 6" DBH	30-79%	21-29%			
Me.	304,790	284,490	794,915	248,258	976,458	1,703,727	2,608,911
N.H.	263,526	548,225	278,366	296,439	157,477	396,558	1,544,033
Vt.	29,923	73,453	160,147	78,415	225,146	296,733	567,084
Mass.	162,113	288,686	273,266	63,765	170,734	333,085	958,564
R.I.	13,343	436	-	-	59,417	59,417	73,196
Conn.	32,697	40,729	66,551	57,794	18,383	53,071	216,154
N.Y.	214,600	457,171	242,218	231,699	170,269	286,104	1,315,957
N.E. & N.Y.	1,020,992	1,693,190	1,815,463	976,370	1,777,884	3,128,695	7,283,899
N.J.	50	1,000	100	200	2,000	2,000	3,350
Pa.	51,854	40,043	28,078	98,023	157,630	226,292	375,628
All States	1,072,896	1,734,233	1,843,641	1,074,593	1,937,514	3,356,987	7,662,877

*Excludes those "other types" which have 1-20 per cent white pine (above restocking size) but do not contain white pine restocking.

BLUET WHITE PINE IN THE NORTHEASTERN STATES

SCOPE OF THE REPORT

White Pine

The white pine growth in New England and New York comprises 1,257,399 acres and has a normal commercial value of over 500 million dollars. This acreage is classified as follows: Pure pine (80 per cent or over), 2,714,185 acres; mixed pine (51-79 per cent pine in mixture), 2,191,855 acres; and pine stocking and restocking in other types, 1,777,884 acres. Of the total pine acreage, 15.1 per cent is located in the three States of Maine, New Hampshire, and New York. A similar survey in Pennsylvania and New Jersey revealed a total of 578,978 acres of white pine. In the latter State, the white pine is confined to ornamental and forest plantings and to small scattered areas of natural growth in the northern part of the State. In addition, throughout the Northeastern States, there are vast areas of mixed growth with pine stocking of less than 50 per cent. Also, millions of white pines are being planted each year; as for example, 6,612,100 white pines were distributed from the New York State nurseries in 1932.

Table 1.- Acreage of White Pine in Northeastern States

State	Pure White Pine (80-100% white pine)		Mixed Types Contain- ing White Pine		White Pine (above re- stocking size) in "		White Pine Restocking in all types except "Pure Pine Under 6" DBH		Total* (including average restocking to pine)	
	Over 100%	Under 6"	50-100%	21-50%	Other types size) in "	Other types size) in "	6" DBH Pine Under 6" DBH	6" DBH Pine Under 6" DBH	6" DBH Pine Under 6" DBH	6" DBH Pine Under 6" DBH
Me.	204,730	284,450	194,915	243,253	276,423	1,107,727	1,107,727	2,508,911	2,508,911	2,508,911
N.H.	263,226	248,222	278,166	226,423	127,471	326,528	326,528	1,444,032	1,444,032	1,444,032
Vt.	23,963	73,452	160,147	18,415	225,146	225,146	225,146	225,146	225,146	225,146
Mass.	162,112	238,686	273,266	67,762	170,734	333,022	333,022	333,022	333,022	333,022
R.I.	13,343	432	-	-	22,417	22,417	22,417	22,417	22,417	22,417
Conn.	21,627	40,729	66,251	21,754	18,323	22,617	22,617	22,617	22,617	22,617
N.Y.	214,600	457,171	278,218	231,639	170,269	286,104	286,104	1,315,921	1,315,921	1,315,921
N.J.	1,020,222	1,623,190	1,215,423	372,370	1,177,284	3,128,622	3,128,622	3,128,622	3,128,622	3,128,622
P.A.	20	1,000	100	200	2,000	2,000	2,000	2,000	2,000	2,000
Pa.	21,824	40,043	22,079	22,023	127,830	226,292	226,292	226,292	226,292	226,292
All States	1,078,226	1,734,233	1,247,641	1,074,923	1,327,274	3,252,927	3,252,927	3,252,927	3,252,927	3,252,927

*Includes those "other types" which have 1-20 per cent white pine (above restocking size) but do not contain white pine restocking.

Table 2.- Commercial Value of White Pine in Northeastern States

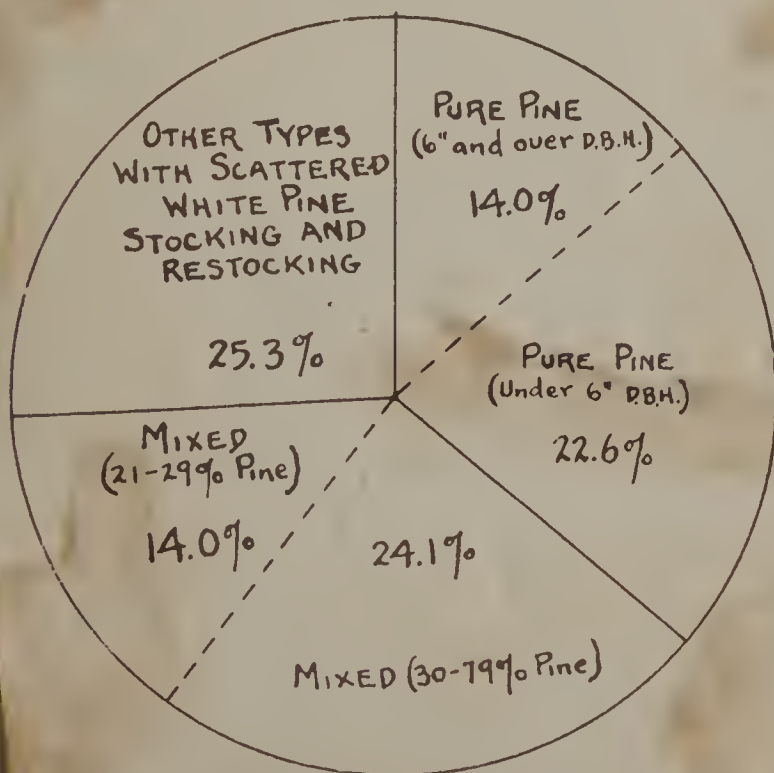
State	Pure White Pine (80-100% white pine)		Mixed Types Containing White Pine		White Pine (above re- stocking size) in Other Types*	White Pine Restocking in all Types Ex- cept "Pure Pine Under 6" DBH	Total (Including white pine restocking)
	6" and Over DBH	Under 6" DBH	30-79%	21-29%			
Me.	\$ 34,136,480	\$ 7,112,250	\$ 44,515,240	\$ 6,951,224	\$ 6,835,206	\$2,559,199	\$102,109,599
N.H.	29,514,912	13,705,625	15,588,496	8,300,292	1,102,339	707,534	68,919,198
Vt.	3,351,376	1,836,325	8,968,232	2,195,620	1,576,022	412,279	18,339,854
Mass.	18,156,656	7,217,150	15,302,896	1,785,420	1,195,138	599,752	44,257,012
R.I.	1,494,416	10,900	-	-	415,919	80,818	2,002,053
Conn.	3,662,064	1,018,225	3,726,856	1,618,232	128,681	86,358	10,240,416
N.Y.	24,035,200	11,429,275	13,564,208	6,487,572	1,191,883	419,084	57,127,222
N.E. & N.Y.	114,351,104	42,329,750	101,665,928	27,338,360	12,445,188	4,865,024	302,995,354
N.J.	5,600	25,000	5,600	5,600	14,000	2,000	57,800
Pa.	5,807,648	1,021,075	1,572,368	2,744,644	1,103,410	226,292	12,475,437
All States	\$120,164,352	\$43,375,825	\$103,243,896	\$30,088,604	\$13,562,598	\$5,093,316	\$315,528,591

*Excludes those "other types" which have 1-20 per cent white pine (above restocking size) but do not contain white pine restocking.

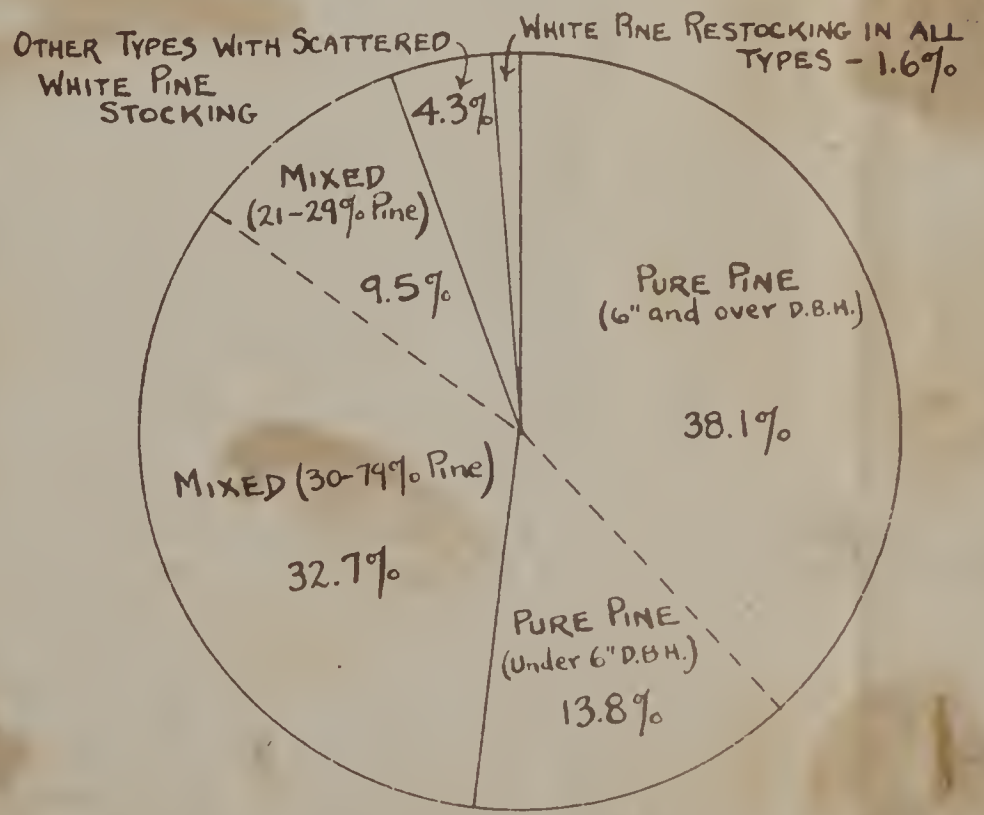
Basis for estimating value of merchantable white pines: stumpage figured at normal value of \$7.00 per M - average volume per acre, pure merchantable white pine = 16 M board feet, mixed white pine, 30-79% = 8 M board feet, mixed white pine, 20-29% = 4 M board feet, and white pine, above restocking size, in other types = 1 M board foot. Pure stands of white pine under 6" DBH given normal value of \$25.00 per acre.

Basis for estimating normal per acre value of white pine restocking: degree of restocking, light = \$1.00, medium = \$2.00, heavy = \$3.00.

ACREAGE AND COMMERCIAL VALUE OF WHITE PINE IN THE NORTHEASTERN STATES.



ACREAGE - 7,662,877



COMMERCIAL VALUE - \$315,528,591.

Table 2. Commercial Value of White Pine in Northeastern States

State	Pure White Pine (20-100% white pine)		Mixed Types containing White Pine		White Pine (above re-stocking size) in		White Pine Restocking in all types except "pure white pine" under 6" DBH		Total (Incl. white restocking)
	Over 6" DBH	Under 6" DBH	30-100	51-250	61-100	101-150	151-200	201-250	
Me.	\$4,135,480	\$7,113,250	\$4,715,240	\$6,951,254	\$6,835,206	\$2,559,199	\$102,410	\$102,410	\$102,410
N.H.	\$9,514,912	\$13,105,625	\$12,528,466	\$8,300,292	\$1,002,339	\$102,410	\$102,410	\$102,410	\$102,410
Vt.	\$3,331,376	\$1,832,325	\$8,968,232	\$2,192,620	\$1,176,022	\$102,410	\$102,410	\$102,410	\$102,410
Mass.	\$8,156,662	\$7,217,170	\$12,302,822	\$1,782,420	\$1,192,132	\$102,410	\$102,410	\$102,410	\$102,410
N.J.	\$1,494,416	\$10,900	-	-	\$102,410	\$102,410	\$102,410	\$102,410	\$102,410
Conn.	\$3,662,064	\$1,018,225	\$3,126,856	\$1,618,232	\$122,681	\$102,410	\$102,410	\$102,410	\$102,410
N.Y.	\$4,032,200	\$11,029,275	\$13,524,202	\$2,427,272	\$179,687	\$102,410	\$102,410	\$102,410	\$102,410
P.E.S.	\$14,351,104	\$20,359,750	\$101,662,928	\$7,338,360	\$12,445,182	\$102,410	\$102,410	\$102,410	\$102,410
N.I.	\$7,607	\$22,000	\$2,600	\$2,600	\$14,000	\$102,410	\$102,410	\$102,410	\$102,410
Pa.	\$3,807,648	\$1,021,075	\$1,572,762	\$2,444,644	\$1,102,410	\$102,410	\$102,410	\$102,410	\$102,410
All States	\$70,164,322	\$43,375,825	\$107,245,266	\$19,022,604	\$17,562,592	\$12,092,316	\$102,410	\$102,410	\$102,410

*Excludes those "other types" which have 1-50% pure white pine (above restocking size) but do not contain white pine restocking.

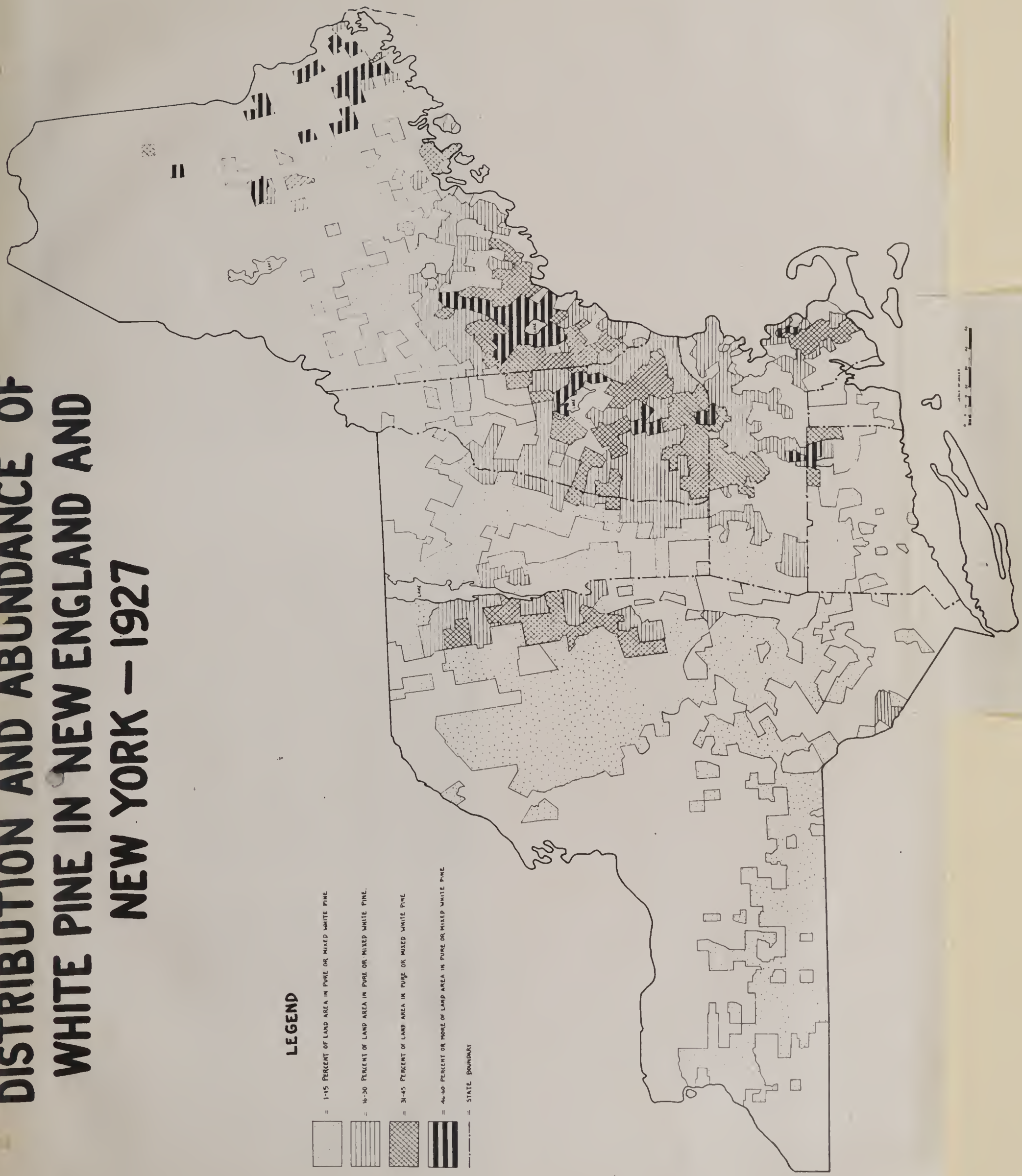
Basis for estimating value of merchantable white pine: Average volume of 10 M board feet, mixed white pine, 30-100% = 2 M board feet, mixed white pine, 20-50% = 1 M board feet, and white pine, above restocking size, in other types = 1 M board feet. Pure stands of white pine under 6" DBH given normal value of \$25.00 per acre.

Basis for estimating normal per acre value of white pine restocking: Average restocking, light = \$1.00, medium = \$2.00, heavy = \$3.00.

DISTRIBUTION AND ABUNDANCE OF WHITE PINE IN NEW ENGLAND AND NEW YORK — 1927

LEGEND

- [White box] = 1-15 PERCENT OF LAND AREA IN PURE OR MIXED WHITE PINE
- [Horizontal lines box] = 16-30 PERCENT OF LAND AREA IN PURE OR MIXED WHITE PINE
- [Cross-hatch box] = 31-45 PERCENT OF LAND AREA IN PURE OR MIXED WHITE PINE
- [Vertical lines box] = 46-60 PERCENT OR MORE OF LAND AREA IN PURE OR MIXED WHITE PINE
- [Dashed line] = STATE BOUNDARY



Scale of miles
0 10 20 30 40 50 60 70 80 90 100

Ribes

Wild Ribes occur more or less generally distributed throughout the white pine region of the Northeastern States, but vary locally as to site, species, size, and abundance. Nine indigenous species have been encountered in control work, four being gooseberries and five currants, exclusive of Ribes vulgare which is considered an escaped cultivated red currant. In certain sites, the Ribes number 100 or more per acre, and in others are few or entirely absent. The aggregate, however, represents many millions of such bushes, as evidenced by the eradication of 93,589,775 wild Ribes in New England and New York during the period 1913 to 1932, inclusive. It has been determined by Fivaz that shade is an important factor in eliminating and suppressing Ribes, that Ribes seed remain dormant and viable in the duff for years, and that disturbance of the duff by logging, fire, animals, or mechanical means favors the germination of such dormant seeds. Therefore, Ribes are found most abundant in open situations, such as recently cut-over or burned areas, pastures, swamps, fence rows, etc. The cultivated Ribes problem is indicated by the 695,565 cultivated bushes that have been destroyed in applying control measures since 1913. The amount and distribution of wild Ribes per acre, based on town units, is designated on the following map.

Infection

Blister rust infection is general throughout the commercial white pine range of the Northeastern and Lake States. Over extensive areas, from 1 to 20 per cent or more of the pines are infected; and in many local pine tracts, from 50 to 100 per cent of the trees are dead or dying. The amount of disease varies considerably in different localities, and is directly influenced by such factors as the number of original infection centers caused by the planting of imported diseased pine, the distribution and amount of native pine, association of pine and Ribes, abundance of Ribes, climatic conditions, and the application of control measures. In Essex and Warren Counties, New York, and in the upper Connecticut River valley region, where Ribes are generally abundant, pine infection is also heaviest; 11 to 20 per cent or more of the trees being diseased. In southern New England and in most of southern New York, less than one per cent of the pines are infected, except in a few limited areas. The distribution and amount of disease based on township units in New England and New York is shown by the following map. A direct correlation between pine infection and abundance of Ribes is apparent when this map is compared with the Ribes map on page 5.

The disease has been established in Pennsylvania and the Lake States about as long as in New England and New York, but due chiefly to fewer importations of infected stock and localization of native pine areas, it has not developed and spread as rapidly as in the latter section. However, during recent years, the amount and extent of the disease in Pennsylvania and the Lake States has increased at an alarming rate and the need for general application of control measures has become most urgent.

Wild Ribes occur more or less generally distributed throughout the white pine region of the Northeastern States, but vary locally as to size, shape, color, and abundance. Nine indigenous species have been recorded in control work, four being considered as subspecies and five as varieties, exclusive of Ribes vulgare which is considered an escaped cultivated red currant. In certain areas, the Ribes number 100 or more per acre, and in others are few or entirely absent. The aggregate, however, represents any millions of such bushes, as evidenced by the eradication of 97,559,775 wild Ribes in New England and New York during the period 1918 to 1928, inclusive. It has been determined by Tulas that shade is an important factor in eliminating and suppressing Ribes, that Ribes seed remain dormant and viable in the duff for years, and that disturbance of the duff by logging, fire, animals, or mechanical means favors the germination of such dormant seeds. Therefore, Ribes are found most abundant in open situations, such as recently cut-over or burned areas, pastures, swamps, fence rows, etc. The cultivated Ribes problem is indicated by the 50,525 cultivated bushes that have been destroyed in applying control measures since 1918. The amount and distribution of wild Ribes per acre, based on town units, is designated on the following map.

infection

Winter rust infection is general throughout the commercial white pine ranges of the Northeastern and Lake States. Over extensive areas, from 1 to 20 per cent or more of the pines are infected; and in many local pine tracts, from 50 to 100 per cent of the trees are dead or dying. The amount of disease varies considerably in different localities, and is directly influenced by such factors as the number of original infection centers caused by the planting of imported diseased pine, the distribution and amount of native pine, association of pine and Ribes, abundance of Ribes, climatic conditions, and the application of control measures. In Lake and Western Counties, New York, and in the upper Connecticut River valley region, where Ribes are generally abundant, pine infection is also heaviest; 11 to 20 per cent or more of the trees being diseased. In southern New England and in most of southern New York, less than one per cent of the pines are infected, except in a few limited areas. The distribution and amount of disease based on township units in New England and New York is shown by the following map. A direct correlation between pine infection and abundance of Ribes is apparent when this map is compared with the Ribes map on page 5.

The disease has been established in Pennsylvania and the Lake States about as long as in New England and New York, but due chiefly to fewer importations of infected stock and localization of native pine areas, it has not developed and spread as rapidly as in the latter section. However, during recent years, the amount and extent of the disease in Pennsylvania and the Lake States has increased at an alarming rate and the need for general application of control measures has become most urgent.

DISTRIBUTION AND ABUNDANCE OF WILD RIBES IN NEW ENGLAND AND NEW YORK

BASIS

NUMBER OF WILD RIBES PER ACRE OF LAND AREA IN EACH TOWN

LEGEND

LESS THAN ONE WILD RIBES PER ACRE

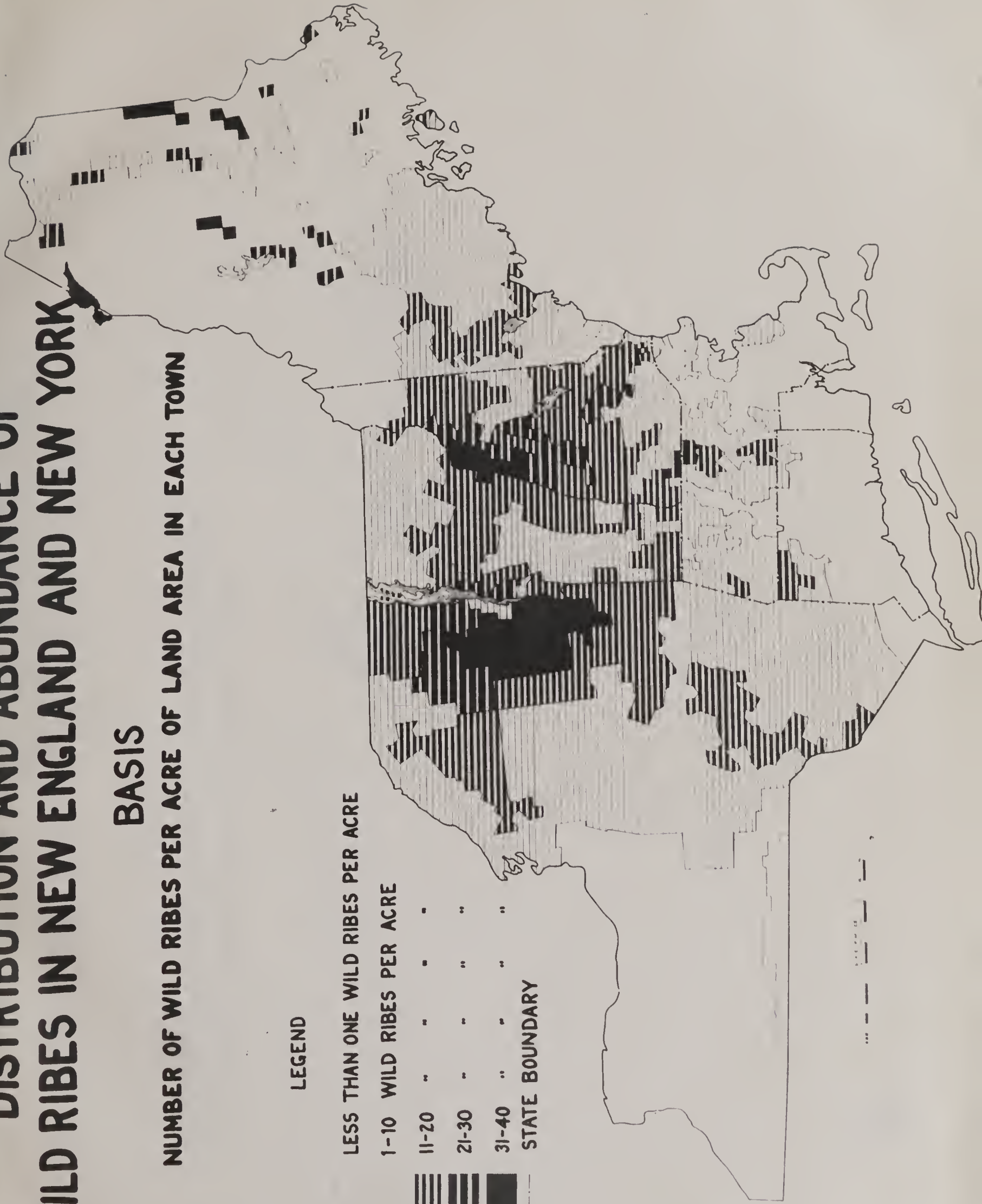
1-10 WILD RIBES PER ACRE

11-20 " " "

21-30 " " "

31-40 " " "

STATE BOUNDARY



--- STATE BOUNDARY ---

POLICY

During the period 1918 to 1921, inclusive, the Federal Government cooperated with the states in experimental control work on a dollar for dollar basis. This work was conducted in each state under a cooperative agreement between the United States Department of Agriculture and the authorized state regulatory agency, the latter usually being the state forestry department. The control work was directed by the state officials under the general supervision of the Government, which paid a part of the Ribes eradication costs.

In 1922, a new program to secure the general application of control measures was initiated by the United States Department of Agriculture, the state regulatory agencies, and the state extension services. This program has been in operation since that time. The object of this cooperative work is to accomplish the control of blister rust by providing pine owners with the expert advice, leadership, and supervision needed to secure prompt and effective local eradication of Ribes in the pine growing regions. The Government is primarily responsible for furnishing each cooperating state with one or more trained agents, who function as leaders in control work. In addition, the Government conducts experiments and demonstrations to improve control practices, obtains data on spread of the rust, and gives general supervision and regional leadership. All Federal cooperative expenditures are offset by state expenditures of at least equal amount. The cooperating state regulatory agencies are responsible for the following: (1) the administrative direction of the employees furnished by the Government; (2) cooperation with counties, townships, associations, and individuals in control work; (3) adequate supervision and checking of local eradication of Ribes to secure effective destruction of such bushes; and (4), enforcement of any necessary regulatory measures. The state extension services cooperate, wherever practicable, by making available such facilities of their organizations as will promote the control program.

In New England and New York, this program has been in successful operation since its adoption in 1922. However, in the Lake States, Pennsylvania, and New Jersey, the control activities were not organized on a similar basis until 1929. There are several reasons for the restriction of the control activities outside New England and New York. The principal ones are the few original introductions of the disease and its relatively slow establishment and spread, the scattered distribution of the white pine, the passive public interest in forestry and lack of adequate state appropriations for control work. Hence, up to 1929, cooperative activities outside New England and New York were limited to a small amount of scouting, eradication of new centers of infection, and to investigational and informational work. The natural spread of the disease during the past three years has greatly increased the infested area outside New England and New York. As a result, definite control programs have been adopted in Pennsylvania, New Jersey, Michigan, Wisconsin, and Minnesota, and a limited amount of control work performed.

POLICY

During the period 1918 to 1921, inclusive, the Federal Government cooperated with the states in experimental control work on a dollar for dollar basis. This work was conducted in each state under a cooperative agreement between the United States Department of Agriculture and the authorized state regulatory agency, the latter usually being the state forestry department. The control work was directed by the state officials under the general supervision of the Government, which paid a part of the Ribes eradication costs.

In 1922, a new program to secure the general application of control measures was initiated by the United States Department of Agriculture, the state regulatory agencies, and the state extension services. This program has been in operation since that time. The object of this cooperative work is to accomplish the control of blight by providing pine owners with the expert advice, leadership, and supervision needed to secure prompt and effective local eradication of Ribes in the pine growing regions. The Government is primarily responsible for furnishing each cooperating state with one or more trained agents, who function as leaders in control work. In addition, the Government conducts experiments and demonstrations to improve control practices, obtains data on spread of the rust, and gives general supervision and regional leadership. All Federal cooperative expenditures are offset by state expenditures of at least equal amount. The cooperating state regulatory agencies are responsible for the following: (1) the administrative direction of the employees furnished by the Government; (2) cooperation with counties, townships, associations, and individuals in control work; (3) adequate supervision and checking of local eradication of Ribes to secure effective destruction of such bushes; and (4), enforcement of any necessary regulatory measures. The state extension services cooperate, wherever practicable, by making available such facilities of their organizations as will promote the control program.

In New England and New York, this program has been a successful operation since its adoption in 1922. However, in the Lake States, Pennsylvania, and New Jersey, the control activities were not organized on a similar basis until 1929. There are several reasons for the restriction of the control activities outside New England and New York. The principal ones are the few original introductions of the disease and its relatively slow establishment and spread, the scattered distribution of the white pine, the passive public interest in forestry and lack of adequate state appropriations for control work. Hence, up to 1929, cooperative activities outside New England and New York were limited to a small amount of scouting, eradication of new centers of infection, and to investigational and informational work. The natural spread of the disease during the past three years has greatly increased the infested area outside New England and New York. As a result, definite control programs have been adopted in Pennsylvania, New Jersey, Michigan, Wisconsin, and Minnesota, and a limited amount of control work performed.

BLISTER RUST CONTROL ACTIVITIES IN THE NORTHEASTERN STATES

Informational and Service

Successful informational and service activities are essential to secure the cooperation of individuals and towns in the application of control measures. The informational features are used to create general and favorable attention, interest and desire; while the service work is required to obtain general, prompt, and effective cooperation. A summary of these activities performed by the district blister rust control agents in New England and New York is given in Tables 3 to 8.

The number of district agents in the cooperating states has not been uniform or constant; consequently, no satisfactory comparison can be made of the volume of the educational and service work performed in the different states, based on total figures. However, a comparison is possible on the basis of the work done by the average district agent in each state as given in Tables 3, 4, 5, and 8.

It will be noted from Table 3, summarizing the 1932 work, that the agents in New Hampshire and Rhode Island rated above the average for all states in most of the informational features, while the Massachusetts agents were above the average in four items. In the other states, especially New York and Maine, the informational activities were strikingly below the average.

Table 8 indicates a general decrease in the use of informational features during the past few years. This is due to fewer agents being employed and to the fact that such activities have purposely not been emphasized as strongly as during the early years of the program. The control work has now reached a stage where the chief objective is to retain public interest in maintaining control, and this can be accomplished with a reduced volume of informational features. A comparison of these activities in 1931 and 1932 (Table 7) shows good increases in the number of talks given at meetings, attendance at meetings, field demonstration meetings and number of publications distributed. Other items decreased during 1932. A comparison based on each agent's work is however the most satisfactory index. Such a summary has been made and the analysis of each agent's work will be discussed with the respective state leaders and corrective action taken where necessary.

A comparison of the 1932 service activities in the various states, based on the work of the average permanent agent in each state, (Table 4) shows that the Vermont agent rated above the average for all states in all three phases of this work, while the results attained by the average permanent agent in New Hampshire, Massachusetts, and Rhode Island were above the general average in two of the items. Maine rated above average in initial interviews, but was below in the other two features. New York fell below the average in all phases of the service work, chiefly because a larger part of the agents' time was devoted to pine classification, mapping, and Ribes scouting.

During 1932, there was a substantial increase in the number of initial interviews made by the average permanent agent (Table 4). Of the total number 49.7% were for the purpose of obtaining general support (Table 5), 44.2% to secure the eradication of wild and cultivated Ribes, and 6.1% to obtain the cooperation of individuals in destroying cultivated Ribes only. It will be noted that in the states where control work is conducted chiefly in cooperation with towns (Maine and New Hampshire) or where the state pays the entire cost (Rhode Island) the majority of the interviews were for the purpose of obtaining general support only. In the other states, where most of the control work is performed in cooperation with individuals, the bulk of the interview work was in connection with solicitation of such cooperation.

LISTED MUST CONTROL ACTIVITIES IN THE UNITED STATES

Informational and Service

Successful informational and service activities are essential to secure the cooperation of individuals and towns in the application of control measures. The informational features are used to create general and favorable attention, interest and desire; while the service work is required to obtain general, prompt, and effective cooperation. A summary of these activities performed by the district director in New England and New York is given in Tables 3 to 8.

The number of district agents in the cooperating states has not been uniform or constant; consequently, no satisfactory comparison can be made of the volume of the informational and service work performed in the different states, based on total figures. However, a comparison is possible on the basis of the work done by the average district agent in each state as given in Tables 3, 4, 5, and 8.

It will be noted from Table 3, summarizing the 1932 work, that the agents in New Hampshire and Rhode Island rated above the average for all states in most of the informational features, while the Massachusetts agents were above the average in four items. In the other states, especially New York and Maine, the informational activities were strikingly below the average.

Table 2 indicates a general decrease in the use of informational features during the past few years. This is due to fewer agents being employed and to the fact that such activities have purposely not been emphasized as strongly as during the early years of the program. The control work has now reached a stage where the chief objective is to retain public interest in maintaining control, and this can be accomplished with a reduced volume of informational features. A comparison of these activities in 1931 and 1932 (Table 7) shows good increases in the number of talks given at meetings, attendance at meetings, field demonstration meetings and number of publications distributed. Other items decreased during 1932. A comparison based on each agent's work is however the most satisfactory index. Such a summary has been made and the analysis of each agent's work will be discussed with the respective state leaders and corrective action taken where necessary.

A comparison of the 1932 service activities in the various states, based on the work of the average permanent agent in each state (Table 4) shows that the Vermont agent rated above the average for all states in all three phases of this work, while the results attained by the average permanent agent in New Hampshire, Massachusetts, and Rhode Island were above the general average in two of the items. Maine rated above average in initial interviews, but was below in the other two features. New York fell below the average in all phases of the service work, chiefly because a larger part of the agents' time was devoted to plane classification, mapping, and filing accounts.

During 1932, there was a substantial increase in the number of initial interviews made by the average permanent agent (Table 4). Of the total number 147 were for the purpose of obtaining general support (Table 5), 44 to secure the eradication of wild and cultivated birds, and 53 to obtain the cooperation of individuals in destroying cultivated birds only. It will be noted that in the states where control work is conducted chiefly in cooperation with towns (Maine and New Hampshire) or where the results of the interviews of the agents were for the

**Table 3.- Informational Activities Performed in Each of the Northeastern States
During 1932 by the Permanent District Agents**

State	Me.	N.E.	Vt.	Mass.	R.I.	N.Y.	N.E.& N.Y.
Meetings Addressed	26	101	-	8	30	66	231
Field Demonstration Meetings	1	5	12	13	2	5	38
Displays Placed	2	26	2	16	3	9	58
Mimeo.Articles Distributed	1,586	4,246	2	573	-	1	6,408
Publications Distributed	2,690	9,217	475	8,156	3,715	8,656	32,909
Items Published	5	116	15	44	22	123	325
Posters and Signs Placed	140	308	128	33	-	854	1,463
Roadside Demonstrations Placed	7	9	-	28	1	1	46

No permanent district agents employed in Connecticut and Pennsylvania.

Average*Per Agent Per State

State	Me.	N.H.	Vt.	Mass.	R.I.	N.Y.	N.E.& N.Y.
Meetings Addressed	6.5	16.6	-	1.7	30.0	6.7	8.7
Field Demonstration Meetings	0.3	0.8	13.3	2.8	2.0	0.5	1.4
Displays Placed	0.5	4.3	2.2	3.4	3.0	0.9	2.2
Mimeo.Articles Distributed	396.5	696.1	2.2	121.9	-	0.1	240.9
Publications Distributed	672.5	1511.0	527.8	1735.3	3715.0	874.3	1237.2
Items Published	1.3	19.2	16.7	9.4	22.0	12.4	12.2
Posters and Signs Placed	35.0	50.5	142.2	7.0	-	86.3	55.0
Roadside Demonstrations Placed	1.8	1.4	-	6.0	1.0	0.1	1.7

Note: The above averages were obtained by dividing the total state figures by the average number of permanent agents employed during the year, the latter number being weighted according to the length of time each agent worked.

Table 1. - Information Activities Performed in Year of the Northeastern States
During 1952 by the Permanent District Agents

State	Me.	N.H.	Vt.	Mass.	R.I.	N.Y.	P.E. & N.Y.
Letters Addressed	25	101	-	8	30	66	251
Field Demonstration Activities	1	2	12	13	2	5	78
Displays Placed	2	26	2	12	3	9	78
News Articles Distributed	1,782	4,246	2	213	-	1	6,408
Publications Distributed	2,690	2,217	472	8,156	3,732	8,652	75,309
Items Published	2	112	12	14	22	127	122
Posters and Signs Placed	140	308	128	72	-	824	1,467
Roadside Demonstrations Placed	7	2	-	28	1	1	46

No permanent district agents employed in Connecticut and Tennessee.

Average* per Agent per State

State	Me.	N.H.	Vt.	Mass.	R.I.	N.Y.	P.E. & N.Y.
Letters Addressed	6.5	12.6	-	1.7	30.0	6.1	8.1
Field Demonstration Activities	0.3	0.8	12.7	2.8	2.0	0.5	1.4
Displays Placed	0.5	4.3	2.2	3.4	7.0	0.2	5.2
News Articles Distributed	796.2	690.1	2.2	121.9	-	0.1	640.2
Publications Distributed	672.2	1211.0	227.3	1732.2	3112.0	2744.3	1237.2
Items Published	1.7	12.2	10.7	9.4	22.0	12.4	12.2
Posters and Signs Placed	32.0	50.2	122.2	7.0	-	22.3	22.0
Roadside Demonstrations Placed	1.8	1.4	-	6.2	1.0	0.1	1.1

Note: The above averages were obtained by dividing the total state figures by the average number of permanent agents employed during the year, the latter number being weighted according to the length of time each agent worked.

Table 4.- Service Activities Performed in Each of the Northeastern States During 1932 by the Permanent District Agents

State	Number Initial Interviews		Number Follow-up Calls		Personal Instruction In Field	
	Total	Weighted Ave.Per Agent Per State	Total	Weighted Ave.Per Agent Per State	Total No. Individuals	Weighted Ave.Per Agent Per State
Me.	820	205.0	370	92.5	181	45.3
N.H.	999	163.7	1,480	242.6	465	76.2
Vt.	424	471.1*	150	166.7	261	290.0
Mass.	1,258	267.7	350	74.5	312	66.4
R.I.	371	371.0	480	480.0	36	36.0
N.Y.	1,548	156.3	1,329	134.2	323	32.6
N.E. & N.Y.	5,420	203.8	4,159	156.4	1,578	59.3

*Employed part time.

Table 5.- Classification, by Purpose, of Initial Interviews and Follow-up Calls Made by Permanent District Agents in the Northeastern States During 1932

(Based on average permanent agent in each state)

State	Initial Interviews				Follow-up Calls			
	Erad.of Wild & Cult.Ribes	Erad.of Cult.Ribes Only	General Support Only	Total Number	Erad.of Wild & Cult.Ribes	Erad.of Cult.Ribes Only	General Support Only	Total Number
Me.	18.2	6.3	180.5	205.0	5.7	0.3	86.5	92.5
N.H.	13.6	2.7	147.4	163.7	5.7	0.8	236.1	242.6
Vt.	361.1	14.4	95.6	471.1	156.7	4.4	5.6	166.7
Mass.	164.9	33.2	69.6	267.7	49.6	11.9	13.0	74.5
R.I.	5.0	29.0	337.0	371.0	-	4.0	476.0	480.0
N.Y.	114.3	9.1	32.9	156.3	87.7	5.2	41.3	134.2
N.E. & N.Y.	90.0	12.4	101.4	203.8	48.9	4.6	102.9	156.4

No permanent district agents employed in Connecticut and Pennsylvania.

Table 6.- Summary, by States, of Informational and Service Activities Performed by Permanent and Temporary Blister Rust Control Agents in the Northeastern States During the Period 1923-1932, Inclusive

Informational

State	Me.	N.H.	Vt.	Mass.	R.I.	Conn.	N.Y.	Totals
Meetings addressed	418	1,714	369	401	138	47	965	4,052
Attendance	24,650	107,393	17,897	26,766	12,074	1,940	81,435	272,155
Field dem.meetings	868	721	383	453	22	31	265	2,743
Attendance	4,989	7,973	4,527	3,332	1,243	693	4,451	27,208
Displays placed	904	1,694	518	657	81	117	450	4,421
Publications distributed	64,327	175,073	27,128	140,756	32,796	12,155	127,918	580,153
Mimeo.articles dist. (1928-1932)	4,265	61,691	170	2,362	2,250	91	3,575	74,404
Items published	556	3,425	400	1,961	289	641	2,023	9,295
Posters & signs placed	18,681	19,670	7,064	3,096	2,104	569	8,640	59,824
Roadside dem. placed (1930-1932)	100	27	13	88	3	24	7	262

In addition, during the period July 1 to December 31, 1922, the following general informational work was performed: 251 meetings addressed with an attendance of 29,163 persons, 335 field demonstration meetings attended by 1,732 individuals, 374 displays placed, 35,067 publications distributed, 313 items published and 2,500 posters and signs placed.

Service

State	Me.	N.H.	Vt.	Mass.	R.I.	Conn.	N.Y.	Totals
Initial interviews	27,228	24,839	8,720	28,074	2,467	4,076	19,743	115,147
Follow-up calls	9,015	21,206	6,102	10,180	1,716	3,033	15,128	66,380
Persons instructed in field	19,632	15,577	7,458	10,681	521	1,533	13,713	69,115

During the period July 1 to December 31, 1922, an additional 6,227 initial interviews and 1,924 follow-up calls were made, and 1,540 individuals received personal instruction in the field.

Table 6 - Summary of Information and Service Activities Performed by Permanent and Temporary Field Control Agents in the Eastern States During the Period 1930-1935, Inclusive

Informational

State	No.	N.E.	Vt.	Mass.	N.I.	Conn.	N.Y.	Total
Meetings addressed	418	1,174	359	401	138	74	365	2,939
Attendance	24,652	107,393	17,897	20,766	12,074	1,040	21,435	215,251
Field dem. meetings	338	151	383	453	58	31	252	1,614
Attendance	4,989	7,973	4,527	3,732	1,247	63	4,441	21,972
Displays placed	904	1,694	518	527	81	117	450	4,193
Publications distributed	64,327	172,073	27,128	140,755	32,736	12,127	27,218	439,484
Times articles dist.	4,565	61,621	170	2,322	2,250	21	3,272	67,901
Items published	522	1,422	400	1,967	233	641	8,023	12,568
Posters & signs placed	18,681	19,670	1,064	3,096	2,104	569	3,240	48,424
Household dem. placed	100	27	13	28	3	24	1	176

In addition, during the period July 1 to December 31, 1935, the following general informational work was performed: 251 meetings addressed with an attendance of 22,157 persons, 355 field demonstration meetings attended by 1,732 individuals, 274 displays placed, 25,067 publications distributed, 313 items published and 2,500 posters and signs placed.

Service

State	No.	N.E.	Vt.	Mass.	N.I.	Conn.	N.Y.	Total
Initial interviews	27,228	24,339	8,750	28,074	2,427	4,072	19,712	115,692
Follow-up calls	9,015	21,206	6,108	10,180	1,716	2,023	12,128	52,356
Persons instructed in field	19,632	12,277	5,428	10,487	727	1,223	14,713	64,287

During the period July 1 to December 31, 1935, an additional 6,287 initial interviews and 1,924 follow-up calls were made, and 1,440 individuals received instruction in the field.

Table 7.- Summary of Yearly Informational and Service Activities Performed by Permanent and Temporary Blister Rust Control Agents in New England and New York During Period 1923-1932, Inclusive

Informational

Year	Meetings Addressed		Field Dem. Meetings		Displays Placed	Publications Dist.	Mimeo. Articles Dist.	Items Pub.	Posters & Signs Placed	Road. Dem. Placed
	Number	Attendance	Number	Attendance						
1923	722	32,649	834	5,442	582	51,308	-	1,203	6,499	-
1924	707	47,071	792	4,050	647	55,696	-	1,269	9,553	-
1925	627	45,522	418	2,912	680	68,818	-	1,294	8,894	-
1926	490	33,082	210	5,018	624	76,697	-	1,202	8,056	-
1927	467	34,690	148	2,646	647	88,840	-	1,219	7,041	-
1928	363	21,178	159	2,809	492	62,708	14,953	1,109	7,268	-
1929	204	23,729	70	1,898	358	52,332	23,155	769	4,388	-
1930	144	8,275	44	1,022	215	48,124	20,715	518	3,445	127
1931	95	7,852	30	840	109	36,068	9,165	372	2,922	81
1932	233	18,107	38	571	67	39,562	6,416	340	1,758	54
Totals	4,052	272,155	2,743	27,208	4,421	580,153	74,404	9,295	59,824	262

In addition, during the period July 1 to December 31, 1922, the following general informational work was performed: 251 meetings addressed with an attendance of 29,163 persons, 335 field demonstration meetings attended by 1,732 individuals, 374 displays placed, 35,067 publications distributed, 313 items published and 2,500 posters and signs placed.

Service

Year	Initial Interviews	Follow-up Calls	Persons Instructed in Field
1923	14,724	5,555	4,274
1924	15,984	6,804	6,198
1925	13,819	7,380	11,169
1926	12,153	7,309	11,559
1927	13,120	8,228	13,102
1928	15,644	8,625	8,952
1929	9,013	6,503	6,741
1930	7,905	5,568	3,166
1931	5,789	5,440	2,070
1932	6,996	4,968	1,884
Totals	115,147	66,380	69,115

During the period July 1 to December 31, 1922, an additional 6,227 initial interviews and 1,924 follow-up calls were made, and 1,540 individuals received personal instruction in the field.

Table 1. - Summary of Yearly of Yehudi Ben-Zur's Service Activities Reported by Permanent and Temporary Staff for Control Assets in New Orleans and New York During Period 1952-1953, Inclusive

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in addition, during the period July 1 to December 31, 1952, the following general informational work was performed: 251 meetings addressed with an attendance of 22,107 persons, 755 field demonstration meetings attended by 1,732 individuals, 374 displays placed, 35,067 publications distributed, 313 letters published and 5,500 posters and signs placed.

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Year	Initial Interviews	Follow-up Calls	Persons Interviewed in Field
1993	14,752	14,752	14,752
1994	15,984	16,204	16,198
1995	17,119	17,380	17,109
1996	18,171	18,409	18,259
1997	19,150	19,558	19,105
1998	20,244	20,652	20,252
1999	21,013	21,503	21,711
2000	21,905	22,508	22,186
2001	22,782	23,440	23,070
2002	23,998	24,908	24,884
Total	175,147	182,330	182,115

During the period July 1 to December 31, 1955, an additional 6,287 initial interviews and 1,954 follow-up calls were made, and 1,740 individuals received notification in the field.

Table 8.- Informational and Service Activities Per Permanent Blister Rust Control Agent in New England and New York 1923-1932, Inclusive
(Weighted Average Number Per Year)

Informational

Year	Meetings Addressed		Field Dem. Meetings		Displays Placed	Publications Dist.	Mimeo. Articles Dist.	Items Pub.	Posters & Signs Placed	Road. Dem. Placed
	Number	Attendance	Number	Attendance						
1923	20.2	913.9	18.0	138.0	15.6	1372.1	-	33.8	177.0	-
1924	20.4	1369.4	18.6	102.1	17.1	1545.8	-	36.9	239.8	-
1925	17.5	1279.4	6.4	65.4	16.5	1885.7	-	36.4	182.0	-
1926	14.3	962.0	3.9	94.2	14.5	2178.6	-	35.2	172.2	-
1927	14.5	1077.3	4.2	74.3	16.3	2702.7	-	38.0	164.3	-
1928	11.9	699.1	4.8	90.1	14.6	1948.3	472.5	36.2	187.4	-
1929	7.6	880.9	2.3	69.0	12.9	1834.5	867.2	28.7	126.4	-
1930	5.2	300.7	1.4	36.0	7.3	1657.4	751.6	18.8	93.8	2.9
1931	3.4	289.9	1.0	28.8	3.4	1259.6	343.4	13.7	86.5	1.8
1932	8.7	670.0	1.4	21.5	2.2	1237.2	240.9	12.2	55.0	1.7

Service

Year	Initial Interviews	Follow-up Calls	Persons Instructed in Field
1923	358.0	145.8	87.1
1924	394.7	180.2	115.4
1925	327.3	191.4	237.9
1926	299.5	199.5	282.3
1927	347.7	248.6	350.8
1928	306.9	271.8	227.9
1929	260.3	223.6	165.3
1930	224.1	176.9	88.6
1931	173.9	170.4	58.5
1932	203.8	156.4	59.3

Table 2. - International and Service Activities for Communist Party
Control Agent in New England and New York 1923-1937, Inclusive
(Control Agent's Name for Year)

International

Year	Number	Attendance	Field No.	Attendance	Number	Field No.	Attendance	Number	Field No.
1923	8.1	670.0	1.4	21.0	2.2	1231.2	1240.2	12.2	22.0
1924	3.4	280.2	1.0	22.8	3.4	1229.2	1237.4	12.1	20.2
1925	2.5	200.1	1.4	20.0	1.3	1227.4	1235.2	11.3	18.2
1926	1.6	280.2	2.3	22.0	12.2	1225.2	1233.2	11.2	18.0
1927	11.2	622.1	4.8	20.1	14.2	1223.2	1231.2	11.1	17.9
1928	14.2	1017.3	4.2	14.3	12.3	1221.2	1229.2	11.0	17.3
1929	14.3	922.0	3.2	14.2	11.2	1219.2	1227.2	10.9	17.2
1930	17.2	1217.4	2.4	12.4	10.2	1217.2	1225.2	10.8	17.0
1931	20.4	1302.4	18.2	102.1	17.1	1215.2	1223.2	10.7	16.9
1932	20.2	1212.2	18.0	122.0	15.0	1213.2	1221.2	10.6	16.8

Service

Year	Initial Interviews	Follow-up Calls	Persons Interviewed
1923	228.0	127.2	24.1
1924	327.3	120.2	11.4
1925	321.3	121.4	12.0
1926	222.2	122.2	12.1
1927	347.3	122.2	12.2
1928	302.2	121.2	12.3
1929	220.2	122.2	12.4
1930	224.1	120.2	12.5
1931	122.2	120.4	12.6
1932	202.2	122.4	12.7

Cooperation

The informational and service activities have resulted in excellent public participation in control work, as evidenced by 37,037 individual cooperators expending \$454,438.85 and by 1,617 town appropriations totaling \$448,401.73 (Table 9). These individuals actually furnished labor or the equivalent in money to eradicate the Ribes on their properties. Thousands of additional owners permitted the destruction of their cultivated bushes without compensation. In addition to the above direct cooperation, thousands of individuals gave general support and personal aid to the control work.

Individual cooperation in wild Ribes eradication has been solicited in all the Northeastern States. However, such efforts have been restricted in New Hampshire where the work is done chiefly in cooperation with towns, in Maine during 1931 and 1932 for a similar reason, and in Rhode Island where, except during 1920, state funds have been used to pay the entire cost of the limited amount of necessary control work.

Town cooperation has been obtained chiefly in New Hampshire, Maine, and Connecticut. However, some town funds have also been secured in Vermont and Massachusetts. In New Hampshire, 1,091 town appropriations have made available \$348,348.27 for control work. This amount represents 77.7 per cent of the total town money secured in New England since 1918. Many of the New Hampshire towns have consistently made yearly appropriations until their entire pine areas were cleared of Ribes. In fact, initial control work has been completed in 106 New Hampshire towns. The town money in New Hampshire and Connecticut is turned over to the respective states and expended with additional state funds to clear definite town blocks of Ribes, irrespective of property lines.

In Maine, town cooperation has been obtained since 1921; 486 town appropriations making available \$85,088.44 for control work. Up to 1931, this town money, except for a few thousand dollars, was used to employ town foremen who aided the individual owners in eradicating Ribes concentrations on their properties. A new state policy was inaugurated in Maine in 1931 whereby the town funds were used to employ crews, as in New Hampshire, and the control areas were systematically worked irrespective of property lines, the state paying one-third of the costs of eradicating the Ribes. The 13 town appropriations, totaling \$1,077.91 in Vermont have been used chiefly to pay the excess labor cost of foremen working with individual owners; but in one instance, a part of the money was spent in eradicating the Ribes on a town forest. Town money was secured in Massachusetts only during 1920 and 1921, when four appropriations, totaling \$1,700 were made for control work in Berkshire County.

Individual expenditures for control work have decreased during the depression years since 1929 (Table 13). It is, however, interesting to note that despite the fact 1932 was the worst year of the depression, owners actually expended more money on Ribes eradication than during the previous year. Town cooperation, on the other hand, reached high peaks during 1930 and 1931; but in 1932, there was a decided decrease due chiefly to actions taken by the Governor of New Hampshire. He practically ordered all towns to confine their current appropriations to absolutely essential projects and advised them that compulsory appropriations would not be enforced for blister rust control work.

Cooperation

The informational and service activities have resulted in excellent public participation in control work, as evidenced by \$7,077 individual cooperators expending \$45,478.35 and by 1,617 town appropriations totaling \$48,401.73 (Table 2). These individuals actually furnished labor or the equivalent in money to eradicate the Ribes on their properties. Thousands of additional owners permitted the destruction of their cultivated bushes without compensation. In addition to the above direct cooperation, thousands of individuals gave general support and personal aid to the control work.

Individual cooperation in wild Ribes eradication has been solicited in all the Northeastern States. However, such efforts have been restricted in New Hampshire where the work is done chiefly in cooperation with towns, in Maine during 1931 and 1932 for a similar reason, and in Rhode Island where, except during 1930, state funds have been used to pay the entire cost of the limited amount of necessary control work.

Town cooperation has been obtained chiefly in New Hampshire, Maine, and Connecticut. However, some town funds have also been secured in Vermont and Massachusetts. In New Hampshire, 1,091 town appropriations have made available \$343,348.27 for control work. This amount represents 77.7 per cent of the total town money secured in New England since 1918. Many of the New Hampshire towns have consistently made yearly appropriations until their entire pine areas were cleared of Ribes. In fact, initial control work has been completed in 106 New Hampshire towns. The town money in New Hampshire and Connecticut is turned over to the respective states and expended with additional state funds to clear definite town blocks of Ribes, irrespective of property lines.

In Maine, town cooperation has been obtained since 1931; \$52 town appropriations making available \$27,088.44 for control work. Up to 1931, this town money, except for a few thousand dollars, was used to employ town foremen who aided the individual owners in eradicating Ribes concentrations on their properties. A new state policy was inaugurated in Maine in 1931 whereby the town funds were used to employ crews, as in New Hampshire, and the control areas were systematically worked irrespective of property lines, the state paying one-third of the costs of eradicating the Ribes. The 13 town appropriations, totaling \$1,077.21 in Vermont have been used chiefly to pay the excess labor cost of foremen working with individual owners; but in one instance, a part of the money was spent in eradicating the Ribes on a town forest. Town money was secured in Massachusetts only during 1930 and 1931, when four appropriations, totaling \$1,700 were made for control work in Berkshire County.

Individual expenditures for control work have decreased during the depression years since 1929 (Table 1). It is, however, interesting to note that despite the fact 1932 was the worst year of the depression, owners actually expended more money on Ribes eradication than during the previous year. Town cooperation, on the other hand, reached high years during 1930 and 1931; but in 1932, there was a decided decrease due chiefly to action taken by the Governor of New Hampshire. He practically ordered all towns to confine their current appropriations to absolutely essential projects and advised them that compulsory appropriations would not be allowed for Ribes control work.

Table 9.- Individual and Town Cooperation in Blister Rust Control Work in Northeastern States

State	Period	Individual Cooperation			Town Cooperation	
		No. Cooperators		Amount Expended by Individual Cooperators	No. Town Appropriations	Amount Expended
		Cult. Ribes Erad. Only	Wild & Cult. Ribes Erad.			
Me.	1932	-	42	\$ 3,343.22	34	\$ 8,245.27
	1922-1932	621	10,438	81,984.02	486	85,088.44
	1918-1932	621	10,468	83,147.09	486	85,088.44
N.H.	1932	-	12	317.11	44	9,167.99
	1922-1932	-	532	38,540.13	929	323,291.92
	1918-1932	-	674	46,637.69	1,091	348,348.27
Vt.	1932	-	158	2,689.72	2	529.70
	1922-1932	172	1,978	65,505.67	13	1,077.91
	1918-1932	172	2,039	69,526.78	13	1,077.91
Mass.	1932	309	730	6,173.42	-	-
	1922-1932	7,963	8,941	77,646.45	-	-
	1918-1932	7,963	9,022	83,630.55	4	1,699.22
R.I.	1932	-	-	-	-	-
	1922-1932	-	2	31.36	-	-
	1918-1932	-	8	581.36	-	-
Conn.	1932	-	14	292.00	1	1,633.00
	1922-1932	195	288	7,954.29	23	12,187.89
	1918-1932	195	290	8,354.29	23	12,187.89
N.Y.	1932	-	425	6,078.54	-	-
	1922-1932	-	5,328	149,264.32	-	-
	1918-1932	-	5,369	161,290.40	-	-
N.E. & N.Y.	1932	309	1,381	18,894.01	81	19,575.96
	1922-1932	8,951	27,507	420,926.24	1,451	421,646.16
	1918-1932	8,951	27,870	453,168.16	1,617	448,401.73
Pa.	1932	4	107	615.17	-	-
	1922-1932	12	204	1,270.69	-	-
	1918-1932	12	204	1,270.69	-	-
All States	1932	313	1,488	19,509.18	81	19,575.96
	1922-1932	8,963	27,711	422,196.93	1,451	421,646.16
	1918-1932	8,963	28,074	454,438.85	1,617	448,401.73

In addition, 5 individuals in New Hampshire expended \$42.85 on control work during 1917.

Table 10.- Individual and Town Cooperation in Blister Rust Control
Work in New England and New York, 1918-1932

Year	No. Individual Cooperators		Amount Spent by Individual Cooperators	No. Town Appropriations	Amount Appropriated	Amount Expended
	Cult. Ribes Erad. Only	Wild & Cult. Ribes Erad.				
1918	-	19	\$ 4,188.63	43	\$ 7,200.00	\$ 5,029.11
1919	-	50	6,645.74	38	6,310.00	7,907.31
1920	-	152	8,498.78	51	8,675.00	7,992.09
1921	-	142	12,908.77	34	5,550.00	5,827.06
1922	-	971	28,035.13	58	20,598.29	18,448.62
1923	664	1,968	40,969.47	121	39,530.00	40,150.59
1924	1,714	3,050	44,622.07	151	48,429.25	48,898.50
1925	958	3,069	39,720.06	132	40,975.00	40,351.31
1926	741	3,283	44,254.88	123	40,425.00	41,223.95
1927	834	3,537	49,040.81	125	38,127.00	38,299.74
1928	991	3,390	54,667.68	143	41,117.00	39,038.73
1929	1,016	3,349	49,615.39	156	41,385.23	41,323.28
1930	971	2,419	32,999.65	186	48,143.50	46,880.12
1931	753	1,090	18,107.09	175	48,399.00	47,455.36
1932	309	1,381	18,894.01	81	19,217.09	19,575.96
Totals	8,951	27,870	\$453,168.16	1,617	\$454,081.36	\$448,401.73

In addition 5 individuals in New Hampshire expended \$42.85 on control work during 1917.

Table 10. - Individual and Town Cooperation in Bitter Root Control
 Work in New England and New York, 1914-1935

Year	No. Individuals Cooperators		Amount Spent by Individuals Cooperators	No. Town Appropri- ations	Amount Appropriated	Amount Expended
	Trade Only	Cult. & Biber Wild & Cult.				
1918	-	19	\$ 4,183.67	47	\$ 7,309.00	\$ 7,022.11
1919	-	50	6,645.74	38	6,310.00	5,907.31
1920	-	152	8,498.78	51	6,675.00	5,995.00
1921	-	145	15,308.77	44	7,540.00	6,851.02
1922	-	211	28,035.13	58	50,682.58	18,748.42
1923	624	1,268	40,969.47	121	49,540.00	40,140.00
1924	1,174	2,070	44,652.07	151	48,489.52	48,308.30
1925	378	2,069	32,750.00	142	40,315.00	40,341.17
1926	747	2,582	44,544.88	153	40,427.00	41,323.30
1927	834	2,537	46,040.67	155	38,151.00	38,589.14
1928	907	2,390	34,097.68	147	41,117.00	39,042.72
1929	1,016	2,349	40,915.39	156	41,389.63	41,353.22
1930	971	2,779	35,999.65	162	41,173.50	40,880.15
1931	757	1,000	18,107.09	175	48,398.00	47,452.32
1932	309	1,381	18,824.01	31	19,317.00	19,577.00
Totals	8,921	27,870	\$453,168.76	1,217	\$444,041.36	\$444,401.13

In addition 5 individuals in New Hampshire expended \$48.85 on control work during 1917.

Ribes Eradication

Experimental control work in New England and New York during the period 1918-1921, inclusive, resulted in 1,042,273 acres being cleared of 15,002,878 wild Ribes and 91,725 cultivated bushes at an average cost of 41 cents per acre. The cost per acre was reduced from 73 cents in 1918 to 24 cents in 1921. In the application of control measures during the present program from 1922 to 1932, inclusive, an additional area of 8,567,247 acres in the Northeastern States was eradicated of 80,328,226 wild and 520,701 cultivated Ribes at a per acre cost of 19.2 cents. This acreage, however, includes 874,644 acres re-worked since 1922. Therefore, up to 1932, inclusive, cooperative control work has been conducted on 9,609,520 acres (pine areas and protection zones) on which 95,331,104 wild Ribes and 612,426 cultivated bushes have been destroyed at an average cost of 21.5 cents per acre. An additional 15,167 acres have been cleared of 763,919 wild and 8 cultivated Ribes in connection with the strictly Federal projects on National Forests and Parks during the period 1924-1932, inclusive. Also, special nursery sanitation work during the years 1930-1932, inclusive, when the data has been kept separate, resulted in 73,611 acres being eradicated of 231,510 wild and 4,320 cultivated bushes. This nursery sanitation work includes 60,431 acres of re-eradication. The special black currant eradication projects in Massachusetts, Rhode Island, Connecticut, and New York resulted in the elimination of an additional 66,865 Ribes nigrum and 17,523 other cultivated Ribes since 1927. A summary of all work (regular cooperative, Federal projects, nursery sanitation, and special black currant eradication projects) in the Northeastern States from 1918-1932, inclusive, shows that a total of 96,326,533 wild Ribes and 701,142 cultivated bushes have been destroyed. Excluding the special black currant work, 9,698,298 acres have been cleared of Ribes including 935,536 acres of re-eradication work.

For convenience in analyzing the data, Ribes eradication is divided into two main divisions - regular control work and special control work. The former is separated into cooperative projects and Federal projects; the cooperative projects being subdivided into four classes of control work, as follows: Individual cooperation, town cooperation, state work on individuals' lands and state work on public lands. Each of these four classes for the 1932 work is further divided into initial and re-eradication projects. Special control work consists of the nursery sanitation and black currant eradication projects.

Regular Control Work

Cooperative Projects

The regular cooperative Ribes eradication work in the Northeastern States during 1932 resulted in 542,569 acres being cleared of 4,590,999 wild Ribes and 25,091 cultivated bushes at a total cost of \$122,107.38 or 22.5 cents per acre. In addition, 2,051 acres were eradicated of 195,327 wild Ribes at a total cost of \$2,876.03 in connection with the Federal projects at Acadia National Park and Allegheny National Forest.

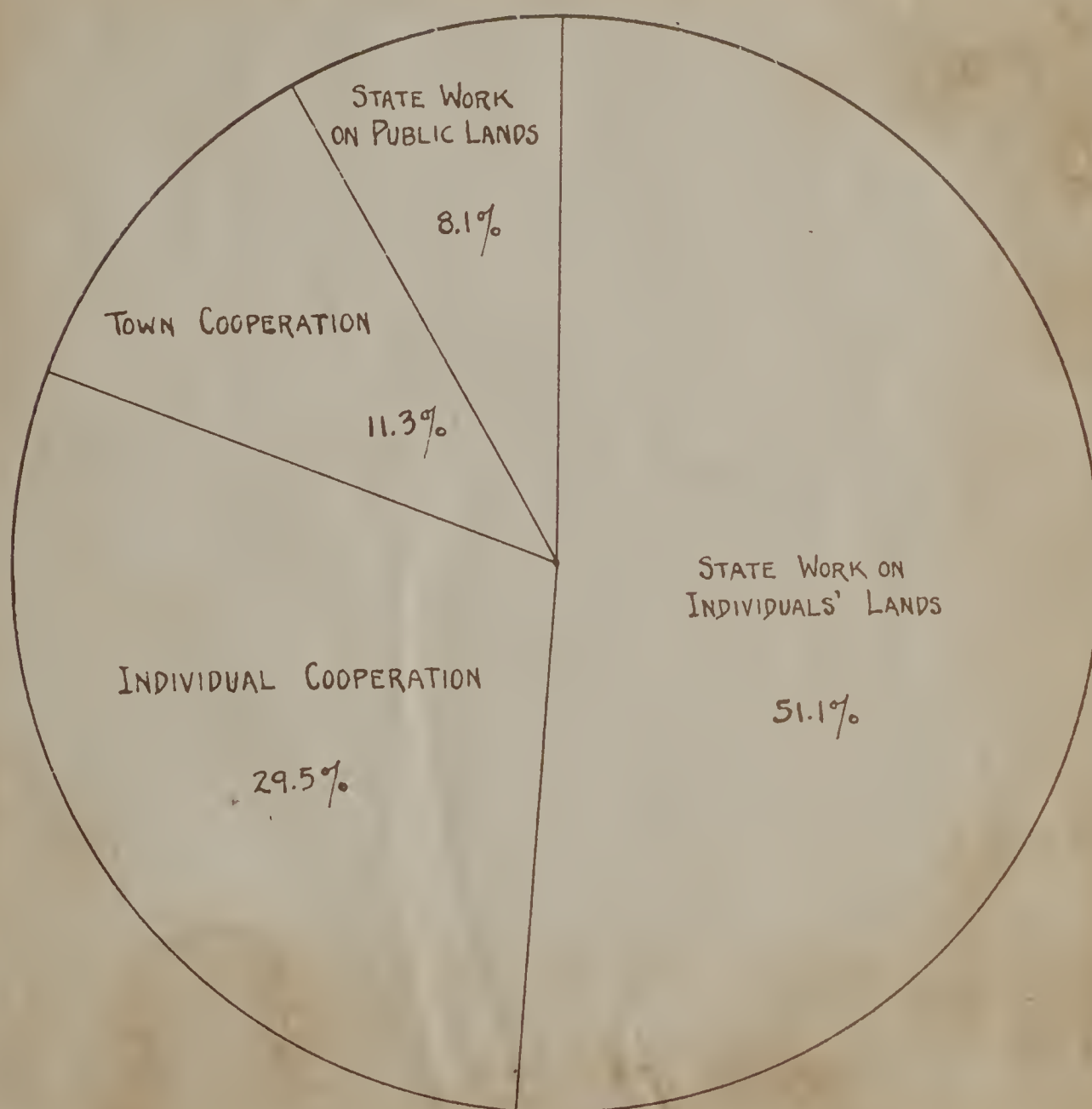
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Effect of method on results

Department of Agriculture

Proportion of Total Area Cleared of Ribes in the Northeastern States
During 1932 by Classes of Regular Cooperative Control Work

(Total Area = 542,569 Acres)



The regular cooperative Ribes eradication work for 1932 and for the period 1922-1932, inclusive, is summarized by the four classes of control work in Tables 11 to 18, inclusive.

Comparison of Total Area Planted in Rubber in the North Borneo States
for the Years 1922-1923 and 1924-1925

(Total Area = 2,111,000 Acres)



The regular cooperative rubber plantation work for 1922 and for the period 1922-1923, inclusive, is summarized by the four classes of control work in Table II to 18, inclusive.

Table 11.- Ribes Eradication in Cooperation with Individuals
in Northeastern States during 1932

State	Type of Erad.	Acreage Examined	Ribes Pulled		Cost					Per Acre	
			Wild	Cult.	Indiv.	Towns	Govt.	State	Total	Cost	Ribes
Me.	Initial	2,217	117,707	381	\$ 1,666.20	-	-	\$ 239.46	\$ 1,905.66	\$.860	53.1
	Re-erad.	592	12,213	93	699.90	-	-	-	699.90	1.18	20.6
	Total	2,809	129,920	474	2,366.10	-	-	239.46	2,605.56	.928	46.3
N.H.	Initial	271	6,387	-	113.89	-	-	28.47	142.36	.525	23.6
	Re-erad.	524	8,054	15	174.71	-	-	43.67	218.38	.417	15.4
	Total	795	14,441	15	288.60	-	-	72.14	360.74	.454	18.2
Vt.	Initial	7,301	33,925	4,060	1,642.05	\$328.15	\$ 97.39	239.39	2,306.98	.316	4.6
	Re-erad.	4,323	23,531	697	1,047.67	201.55	29.68	116.86	1,395.76	.323	5.4
	Total	11,624	57,456	4,757	2,689.72	529.70	127.07	356.25	3,702.74	.319	4.9
Mass.	Initial	7,160	40,119	609	971.10	-	80.00	670.37	1,721.47	.240	5.6
	Re-erad.	82,104	194,187	787	4,939.67	-	322.50	4,639.75	9,901.92	.121	2.4
	Total	89,264	234,306	1,396	5,910.77	-	402.50	5,310.12	11,623.39	.130	2.6
Conn.	Initial	-	-	-	-	-	-	-	-	-	-
	Re-erad.	345	1,833	1,216	192.00	-	92.83	121.34	406.17	1.18	5.3
	Total	345	1,833	1,216	192.00	-	92.83	121.34	406.17	1.18	5.3
N.Y.	Initial	42,077	379,575	1,985	5,685.77	-	-	12,533.22	18,218.99	.433	9.0
	Re-erad.	3,634	24,962	255	365.77	-	-	948.35	1,314.12	.362	6.9
	Total	45,711	404,537	2,240	6,051.54	-	-	13,481.57	19,533.11	.427	8.8
N.E. & N.Y.	Initial	59,026	577,713	7,035	10,079.01	328.15	177.39	13,710.91	24,295.46	.412	9.8
	Re-erad.	91,522	264,780	3,063	7,419.72	201.55	445.01	5,869.97	13,936.25	.152	2.9
	Total	150,548	842,493	10,098	17,498.73	529.70	622.40	19,580.88	38,231.71	.254	5.6
Pa.	Initial	9,366	84,888	3,227	596.57	-	395.20	-	991.77	.106	9.1
	Re-erad.	62	4,673	7	18.60	-	4.20	-	22.80	.368	75.4
	Total	9,428	89,561	3,234	615.17	-	399.40	-	1,014.57	.108	9.5
All States	Initial	68,392	661,601	10,262	10,675.58	328.15	572.59	13,710.91	25,287.23	.370	9.7
	Re-erad.	91,584	269,453	3,070	7,438.32	201.55	449.21	5,869.97	13,959.05	.152	2.9
	Total	159,976	932,054	13,332	\$18,113.90	\$529.70	\$1,021.80	\$19,580.88	\$39,246.28	.245	5.8

Table II. - Hides Production in Cooperation with Indians in Northeastern States during 1932

State	Type of Trade	Average Price Received	Hides Shipped		Total Value	Cost	
			Value	Quantity		Value	Quantity
Alaska	Initial	1.21	1,701	340.2	1,701.00	-	-
	Re-exports	1.21	1,701	340.2	1,701.00	-	-
	Total	1.21	3,402	680.4	3,402.00	-	-
	Initial	1.21	1,701	340.2	1,701.00	-	-
Arizona	Initial	8.07	8,074	1,614.8	8,074.00	-	-
	Re-exports	14.44	14,444	2,888.8	14,444.00	-	-
	Total	14.44	28,888	5,777.6	28,888.00	-	-
	Initial	14.44	14,444	2,888.8	14,444.00	-	-
California	Initial	1.30	1,300	260.0	1,300.00	-	-
	Re-exports	1.30	1,300	260.0	1,300.00	-	-
	Total	1.30	2,600	520.0	2,600.00	-	-
	Initial	1.30	1,300	260.0	1,300.00	-	-
Colorado	Initial	1.18	11,800	2,360.0	11,800.00	-	-
	Re-exports	1.18	11,800	2,360.0	11,800.00	-	-
	Total	1.18	23,600	4,720.0	23,600.00	-	-
	Initial	1.18	11,800	2,360.0	11,800.00	-	-
Idaho	Initial	1.33	1,330	266.0	1,330.00	-	-
	Re-exports	1.33	1,330	266.0	1,330.00	-	-
	Total	1.33	2,660	532.0	2,660.00	-	-
	Initial	1.33	1,330	266.0	1,330.00	-	-
Montana	Initial	1.33	1,330	266.0	1,330.00	-	-
	Re-exports	1.33	1,330	266.0	1,330.00	-	-
	Total	1.33	2,660	532.0	2,660.00	-	-
	Initial	1.33	1,330	266.0	1,330.00	-	-
Nebraska	Initial	1.33	1,330	266.0	1,330.00	-	-
	Re-exports	1.33	1,330	266.0	1,330.00	-	-
	Total	1.33	2,660	532.0	2,660.00	-	-
	Initial	1.33	1,330	266.0	1,330.00	-	-
North Dakota	Initial	1.33	1,330	266.0	1,330.00	-	-
	Re-exports	1.33	1,330	266.0	1,330.00	-	-
	Total	1.33	2,660	532.0	2,660.00	-	-
	Initial	1.33	1,330	266.0	1,330.00	-	-
South Dakota	Initial	1.33	1,330	266.0	1,330.00	-	-
	Re-exports	1.33	1,330	266.0	1,330.00	-	-
	Total	1.33	2,660	532.0	2,660.00	-	-
	Initial	1.33	1,330	266.0	1,330.00	-	-
Texas	Initial	1.33	1,330	266.0	1,330.00	-	-
	Re-exports	1.33	1,330	266.0	1,330.00	-	-
	Total	1.33	2,660	532.0	2,660.00	-	-
	Initial	1.33	1,330	266.0	1,330.00	-	-
Wyoming	Initial	1.33	1,330	266.0	1,330.00	-	-
	Re-exports	1.33	1,330	266.0	1,330.00	-	-
	Total	1.33	2,660	532.0	2,660.00	-	-
	Initial	1.33	1,330	266.0	1,330.00	-	-

Table 12.- Ribes Eradication in Cooperation with Individuals in Northeastern States
During Period 1922-1932, Inclusive

(By Years)

Year	Acreage Examined	Ribes Pulled		Cost					Per Acre	
		Wild	Cult.	Indiv.	Towns	State	Govt.	Total	Cost	Ribes
1922	93,828	2,886,282	8,251	\$ 28,035.13	\$ 820.78	\$ 10,770.02	-	\$ 39,625.93	\$.422	30.8
1923	174,875	3,954,508	31,338	40,969.47	6,910.47	16,356.29	-	64,236.23	.367	22.6
1924	205,084	4,235,627	37,532	44,622.07	8,000.65	18,263.02	-	70,885.74	.346	20.7
1925	209,831	3,567,024	44,811	39,720.06	7,089.87	21,301.74	\$ 16.67	68,128.34	.325	17.0
1926	241,686	5,485,072	36,075	44,172.88	6,747.56	24,909.27	264.90	76,094.61	.315	22.7
1927	291,611	4,993,488	34,066	49,011.06	8,375.41	28,552.54	-	85,939.01	.295	17.1
1928	323,218	4,027,921	37,104	54,667.68	8,089.87	30,180.65	315.88	93,254.08	.289	12.5
1929	280,366	4,278,373	40,716	49,710.89	7,010.13	35,650.95	100.00	92,471.97	.330	15.3
1930	148,532	2,939,888	18,502	31,103.74	6,074.88	20,720.99	536.00	58,435.61	.393	19.8
1931	105,078	965,457	4,899	17,660.57	10.50	16,826.06	866.05	35,363.18	.337	9.2
1932	159,976	932,054	13,332	18,113.90	529.70	19,580.88	1,021.80	39,246.28	.245	5.8
Totals	2,234,085	38,265,694	306,626	\$417,787.45	\$59,659.82	\$243,112.41	\$3,121.30	\$723,680.98	\$.324	17.1

(By States)

State	Acreage Examined	Ribes Pulled		Cost					Per Acre	
		Wild	Cult.	Indiv.	Towns	State	Govt.	Total	Cost	Ribes
Me.	295,896	16,035,125	106,025	\$ 80,646.45	\$58,152.91	\$ 346.45	\$ 16.67	\$139,162.48	\$.470	54.2
N.H.	141,393	3,217,917	9,165	38,387.05	429.00	9,857.84	-	48,673.89	.344	22.1
Vt.	195,697	1,950,227	10,422	65,423.67	1,077.91	9,059.75	981.07	76,542.40	.391	10.0
Mass.	1,030,885	7,689,230	141,688	75,965.55	-	72,342.88	402.50	148,710.93	.144	7.5
R.I.	540	2,175	1,000	31.36	-	94.72	-	126.08	.233	4.0
Conn.	56,331	311,977	6,711	6,935.93	-	6,081.73	1,003.86	14,021.52	.249	5.5
N.Y.	500,170	8,902,618	27,656	149,126.75	-	145,280.44	15.00	294,422.19	.589	17.8
N.E. & N.Y.	2,220,912	38,109,269	302,667	416,516.76	59,659.82	243,063.81	2,419.10	721,659.49	.325	17.2
Pa.	13,173	156,425	3,959	1,270.69	-	48.60	702.20	2,021.49	.153	11.9
All States	2,234,085	38,265,694	306,626	\$417,787.45	\$59,659.82	\$243,112.41	\$3,121.30	\$723,680.98	\$.324	17.1

Table 13.- Ribes Eradication in Cooperation with Towns in Northeastern States - 1932*

State	Type of Erad.	Acreage Examined	Ribes Pulled		Cost				Per Acre	
			Wild	Cult.	Towns	State	Govt.	Total	Cost	Ribes
Me.	Initial	7,689	495,397	3,119	\$ 4,281.03	\$2,098.01	-	\$ 6,379.04	\$.830	64.4
	Re-erad.	7,163	273,129	1,061	3,956.51	1,970.36	-	5,926.87	.827	38.1
	Total	14,852	768,526	4,180	8,237.54	4,068.37	-	12,305.91	.829	51.7
N.H.	Initial	25,011	818,263	1,066	7,062.07	1,765.51	-	8,827.58	.353	32.7
	Re-erad.	16,588	196,361	64	2,105.92	526.47	-	2,632.39	.159	11.8
	Total	41,599	1,014,624	1,130	9,167.99	2,291.98	-	11,459.97	.275	24.4
Conn.	Initial	-	-	-	-	-	-	-	-	-
	Re-erad.	4,730	120,782	-	1,633.00	891.72	\$970.83	3,495.55	.739	25.5
	Total	4,730	120,782	-	1,633.00	891.72	970.83	3,495.55	.739	25.5
Totals	Initial	32,700	1,313,660	4,185	11,343.10	3,863.52	-	15,206.62	.465	40.2
	Re-erad.	28,481	590,272	1,125	7,695.43	3,388.55	970.83	12,054.81	.423	20.7
	Total	61,181	1,903,932	5,310	\$19,038.53	\$7,252.07	\$970.83	\$27,261.43	\$.446	31.1

*Control work performed by block units irrespective of property lines.

Table 14.- Ribes Eradication in Cooperation with Towns in Northeastern States
During Period 1922-1932*

(By Years)

Years	Acreage Examined	Ribes Pulled		Cost					Per Acre	
		Wild	Cult.	Towns	Indiv.	State	Govt.	Total	Cost	Ribes
1922	154,641	1,218,793	7,551	\$ 16,077.90	-	\$ 6,064.96	-	\$ 22,142.86	\$.143	7.9
1923	251,821	3,058,288	20,718	33,240.12	-	14,485.22	-	47,725.34	.190	12.1
1924	326,341	3,991,645	16,071	40,897.85	-	14,878.27	-	55,776.12	.171	12.2
1925	251,669	2,983,216	6,118	33,075.04	-	8,271.20	-	41,346.24	.164	11.8
1926	208,346	2,896,113	3,086	34,476.39	-	10,583.68	-	45,060.07	.216	13.9
1927	220,576	2,447,492	2,572	29,924.33	-	11,416.16	-	41,340.49	.187	11.1
1928	218,986	1,972,684	6,013	30,948.86	-	8,043.37	-	38,992.23	.178	9.0
1929	260,266	2,236,875	14,987	34,313.15	-	9,399.28	\$817.55	44,529.98	.171	8.6
1930	241,127	3,027,616	3,799	40,805.24	-	9,604.30	659.17	51,068.71	.212	12.6
1931	190,704	4,064,908	8,995	47,444.86	\$36.00	16,504.74	-	63,985.60	.336	21.3
1932	61,181	1,903,932	5,310	19,038.53	-	7,252.07	970.83	27,261.43	.446	31.1
Totals	2,385,658	29,801,562	95,220	\$360,242.27	\$36.00	\$116,503.25	\$2,447.55	\$479,229.07	\$.201	12.5

(By States)

States	Acreage Examined	Ribes Pulled		Cost					Per Acre	
		Wild	Cult.	Towns	Indiv.	State	Govt.	Total	Cost	Ribes
Me.	44,473	2,436,250	10,316	\$ 26,039.40	\$36.00	\$ 8,267.30	-	\$ 34,342.70	\$.772	54.8
N.H.	2,250,133	26,129,280	72,684	322,014.98	-	82,624.82	-	404,639.80	.180	11.6
Conn.	91,052	1,236,032	12,220	12,187.89	-	25,611.13	\$2,447.55	40,246.57	.442	13.6
Totals	2,385,658	29,801,562	95,220	\$360,242.27	\$36.00	\$116,503.25	\$2,447.55	\$479,229.07	\$.201	12.5

*Control work performed by block units irrespective of property lines.

Type of Tradition	Number of Traditions		Value		Cost	
	Number	Value	Number	Value	Number	Value
1. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
2. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
3. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
4. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
5. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
6. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
7. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
8. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
9. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
10. Traditions of the Northwest	10	100.00	10	100.00	10	100.00

*Control work performed by block with investigative of property lines.

Table 1. - Types of Traditions in Cooperation with the Government in the Northwest (1942-1943)

Type of Tradition	Number of Traditions		Value		Cost	
	Number	Value	Number	Value	Number	Value
1. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
2. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
3. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
4. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
5. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
6. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
7. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
8. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
9. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
10. Traditions of the Northwest	10	100.00	10	100.00	10	100.00

(By Year)

Type of Tradition	Number of Traditions		Value		Cost	
	Number	Value	Number	Value	Number	Value
1. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
2. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
3. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
4. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
5. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
6. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
7. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
8. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
9. Traditions of the Northwest	10	100.00	10	100.00	10	100.00
10. Traditions of the Northwest	10	100.00	10	100.00	10	100.00

*Control work performed by block with investigative of property lines.

Table 15.- State Work on Individuals' Lands in Northeastern States - 1932

(Areas eradicated of Ribes by scouting methods)

State	Type of Erad.	Acreage Examined	Ribes Pulled		Cost			Per Acre	
			Wild	Cult.	State	Govt.	Total	Cost	Ribes
Me.	Initial	39,329	8,160	69	\$ 290.32	\$ 754.84	\$ 1,045.16	\$.027	0.2
	Re-erad.	22,681	2,155	3	67.13	591.20	658.33	.029	0.1
	Total	62,010	10,315	72	357.45	1,346.04	1,703.49	.027	0.16
N.H.	Initial	54,642	41,878	-	5,735.02	-	5,735.02	.105	0.76
	Re-erad.	-	-	-	-	-	-	-	-
	Total	54,642	41,878	-	5,735.02	-	5,735.02	.105	0.76
Mass.	Initial	5,412	15,439	358	671.89	115.00	786.89	.145	2.9
	Re-erad.	64,346	29,302	1,317	3,035.01	330.00	3,365.01	.052	0.45
	Total	69,758	44,741	1,675	3,706.90	445.00	4,151.90	.060	0.64
R.I.	Initial	497	203	214	195.75	51.00	246.75	.496	0.4
	Re-erad.	5,650	5,595	75	978.35	390.40	1,368.75	.242	1.0
	Total	6,147	5,798	289	1,174.10	441.40	1,615.50	.263	0.94
Conn.	Initial	-	-	-	-	-	-	-	-
	Re-erad.	1,777	6,944	-	289.34	250.67	540.01	.304	3.9
	Total	1,777	6,944	-	289.34	250.67	540.01	.304	3.9
N.Y.	Initial	71,604	299,352	2,928	13,922.03	-	13,922.03	.194	4.2
	Re-erad.	4,162	14,902	85	1,156.87	-	1,156.87	.278	3.6
	Total	75,766	314,254	3,013	15,078.90	-	15,078.90	.199	4.1
N.E. & N.Y.	Initial	171,484	365,032	3,569	20,815.01	920.84	21,735.85	.127	2.1
	Re-erad.	98,616	58,898	1,480	5,526.70	1,562.27	7,088.97	.072	0.59
	Total	270,100	423,930	5,049	26,341.71	2,483.11	28,824.82	.107	1.6
Pa.	Initial	7,438	3,193	74	2.60	116.60	119.20	.016	0.43
	Re-erad.	-	-	-	-	-	-	-	-
	Total	7,438	3,193	74	2.60	116.60	119.20	.016	0.43
All States	Initial	178,922	368,225	3,643	20,817.61	1,037.44	21,855.05	.122	2.1
	Re-erad.	98,616	58,898	1,480	5,526.70	1,567.27	7,088.97	.072	0.59
	Total	277,538	427,123	5,123	26,344.31	2,599.71	28,944.02	.104	1.5

(Approved by the Board of Directors)

Table 16. - State Work* on Individuals' Lands in Northeastern States, 1922-1932

(By Years)

Year	Acreage Examined	Ribes Pulled		Cost					Per Acre	
		Wild	Cult.	Indiv.	Towns	State	Govt.	Total	Cost	Ribes
1922	218,736	294,023	259	-	-	\$ 5,178.51	\$ 3,200.90	\$ 8,379.41	.038	1.3
1923	457,209	233,169	2,999	-	-	12,032.26	2,812.53	14,844.79	.032	0.51
1924	460,739	131,233	20,143	-	-	12,076.07	3,972.39	16,048.46	.035	0.28
1925	366,763	476,012	8,440	-	186.40	17,031.02	2,152.56	19,369.98	.053	1.3
1926	346,010	106,194	11,620	-	-	11,257.44	2,428.90	13,686.34	.040	0.31
1927	373,341	130,643	9,726	29.75	-	12,599.20	3,409.71	16,038.66	.043	0.35
1928	322,417	79,008	13,104	-	-	15,668.93	2,678.39	18,347.32	.057	0.25
1929	344,742	126,144	15,520	74.50	-	14,291.70	1,776.56	16,142.76	.047	0.37
1930	279,070	137,006	6,602	26.50	-	11,487.10	2,285.25	13,798.85	.049	0.49
1931	229,676	190,441	5,802	50.00	-	14,266.98	1,665.46	15,982.44	.070	0.83
1932	277,538	427,123	5,123	-	-	26,344.31	2,599.71	28,944.02	.104	1.5
Totals	3,676,241	2,330,996	99,338	\$180.75	\$186.40	\$152,233.52	\$28,982.36	\$181,583.03	.049	0.63

(By States)

State	Acreage Examined	Ribes Pulled		Cost					Per Acre	
		Wild	Cult.	Indiv.	Towns	State	Govt.	Total	Cost	Ribes
Me.	2,254,328	212,150	1,170	-	\$186.40	\$ 14,138.28	\$23,096.18	\$ 37,420.86	.017	0.09
N.H.	54,642	41,878	-	-	-	5,735.02	-	5,735.02	.105	0.76
Mass.	927,297	1,213,147	82,481	-	-	85,422.39	445.00	85,867.39	.093	1.3
R.I.	185,157	110,832	7,035	-	-	13,355.00	1,822.16	15,177.16	.082	0.59
Conn.	95,763	305,013	3,272	180.75	-	7,291.44	3,290.02	10,762.21	.112	3.2
N.Y.	142,151	443,468	4,830	-	-	26,285.19	-	26,285.19	.185	3.1
N.E. & N.Y.	3,659,338	2,326,488	98,788	\$180.75	\$186.40	\$152,227.32	\$28,653.36	\$181,247.83	.050	0.64
Pa.	16,903	4,508	550	-	-	6.20	329.00	335.20	.020	0.27
All States	3,676,241	2,330,996	99,338	\$180.75	\$186.40	\$152,233.52	\$28,982.36	\$181,583.03	.049	0.63

*Areas eradicated of Ribes by scouting methods.

Table 16. - State work on Indian lands in Northern States, 1902-1903

(By Year)

Year	Amount expended	Salaries	Travel	Printing	Postage	Telephone	Other	Total
1902	25,750.00	10,000.00	2,000.00	1,000.00	500.00	100.00	1,150.00	15,150.00
1903	47,400.00	18,000.00	3,000.00	1,500.00	750.00	200.00	2,550.00	26,400.00
1904	45,750.00	17,000.00	2,500.00	1,200.00	600.00	150.00	2,150.00	24,600.00
1905	100,100.00	40,000.00	5,000.00	2,000.00	1,000.00	300.00	4,600.00	52,900.00
1906	208,010.00	100,000.00	11,000.00	5,000.00	2,500.00	500.00	12,500.00	133,500.00
1907	217,000.00	120,000.00	8,000.00	3,000.00	3,000.00	600.00	15,400.00	148,000.00
1908	128,441.00	50,000.00	7,000.00	3,000.00	1,500.00	300.00	8,800.00	70,600.00
1909	147,000.00	50,000.00	10,000.00	4,000.00	2,000.00	400.00	13,400.00	80,800.00
1910	235,000.00	100,000.00	15,000.00	6,000.00	3,000.00	600.00	20,600.00	135,200.00
1911	220,000.00	90,000.00	10,000.00	5,000.00	2,500.00	500.00	18,500.00	126,500.00
1912	211,000.00	85,000.00	9,000.00	4,500.00	2,000.00	400.00	17,100.00	121,000.00
Total	1,019,641.00	403,000.00	53,000.00	23,000.00	11,000.00	2,800.00	60,400.00	580,200.00

(By States)

State	Amount expended	Salaries	Travel	Printing	Postage	Telephone	Other	Total
Ala.	6,000.00	2,000.00	500.00	200.00	100.00	50.00	1,150.00	4,000.00
Ark.	20,000.00	8,000.00	1,000.00	500.00	250.00	100.00	3,850.00	23,700.00
Cal.	100,000.00	40,000.00	5,000.00	2,000.00	1,000.00	300.00	18,300.00	166,600.00
Col.	100,000.00	40,000.00	5,000.00	2,000.00	1,000.00	300.00	18,300.00	166,600.00
Idaho	100,000.00	40,000.00	5,000.00	2,000.00	1,000.00	300.00	18,300.00	166,600.00
Mont.	100,000.00	40,000.00	5,000.00	2,000.00	1,000.00	300.00	18,300.00	166,600.00
Neb.	100,000.00	40,000.00	5,000.00	2,000.00	1,000.00	300.00	18,300.00	166,600.00
N.J.	100,000.00	40,000.00	5,000.00	2,000.00	1,000.00	300.00	18,300.00	166,600.00
N.Y.	100,000.00	40,000.00	5,000.00	2,000.00	1,000.00	300.00	18,300.00	166,600.00
Ohio	100,000.00	40,000.00	5,000.00	2,000.00	1,000.00	300.00	18,300.00	166,600.00
Pa.	100,000.00	40,000.00	5,000.00	2,000.00	1,000.00	300.00	18,300.00	166,600.00
Tex.	100,000.00	40,000.00	5,000.00	2,000.00	1,000.00	300.00	18,300.00	166,600.00
Wash.	100,000.00	40,000.00	5,000.00	2,000.00	1,000.00	300.00	18,300.00	166,600.00
W. Va.	100,000.00	40,000.00	5,000.00	2,000.00	1,000.00	300.00	18,300.00	166,600.00
Total	1,019,641.00	403,000.00	53,000.00	23,000.00	11,000.00	2,800.00	60,400.00	580,200.00

*Amount expended by State of Alaska, 1902-1903, \$10,000.00.

Table 17.- Ribes Eradication on Public Lands in Northeastern States - 1932
(Excluding Federal lands)

State	Type of Work	Acreage Examined	Ribes Pulled		Cost				Per Acre	
			Wild	Cult.	State	Govt.	Counties	Total	Cost	Ribes
N.H.	Initial	-	-	-	-	-	-	-	-	-
	Re-erad.	196	4,275	-	\$ 92.20	-	-	\$ 92.20	.470	21.8
	Total	196	4,275	-	92.20	-	-	92.20	.470	21.8
Vt.	Initial	175	600	-	54.20	-	-	54.20	.310	3.4
	Re-erad.	50	720	-	18.60	-	-	18.60	.372	14.4
	Total	225	1,320	-	72.80	-	-	72.80	.324	5.9
Mass.	Initial	1,012	51,019	-	625.52	62.50	-	688.02	.680	50.4
	Re-erad.	1,572	4,287	-	174.10	-	-	174.10	.111	2.7
	Total	2,584	55,306	-	799.62	62.50	-	862.12	.334	21.4
R.I.	Initial	-	-	-	-	-	-	-	-	-
	Re-erad.	325	0	-	38.92	10.64	-	49.56	.153	0.0
	Total	325	0	-	38.92	10.64	-	49.56	.153	0.0
Conn.	Initial	-	-	-	-	-	-	-	-	-
	Re-erad.	485	4,897	-	92.00	58.67	-	150.67	.311	10.1
	Total	485	4,897	-	92.00	58.67	-	150.67	.311	10.1
N.Y.	Initial	31,394	544,461	1,285	15,976.22	-	1,252.88	17,229.10	.549	17.3
	Re-erad.	3,026	32,401	-	1,645.82	-	-	1,645.82	.544	10.7
	Total	34,420	576,862	1,285	17,622.04	-	1,252.88	18,874.92	.548	16.8
N.E. & N.Y.	Initial	32,581	596,080	1,285	16,655.94	62.50	1,252.88	17,971.32	.552	18.3
	Re-erad.	5,654	46,580	-	2,061.64	69.31	-	2,130.95	.377	8.2
	Total	38,235	642,660	1,285	18,717.58	131.81	1,252.88	20,102.27	.526	16.8
Pa.	Initial	3,273	632,844	41	4,729.73	-	-	4,729.73	1.45	193.4
	Re-erad.	2,366	52,386	-	1,823.65	-	-	1,823.65	.771	22.1
	Total	5,639	685,230	41	6,553.38	-	-	6,553.38	1.16	121.5
All States	Initial	35,854	1,228,924	1,326	21,385.67	62.50	1,252.88	22,701.05	.633	34.3
	Re-erad.	8,020	98,966	-	3,885.29	69.31	-	3,954.60	.493	12.3
	Total	43,874	1,327,890	1,326	\$25,270.96	\$131.81	\$1,252.88	\$26,655.65	\$.608	30.3

Table 18.- Ribes Eradication on Public Lands in Northeastern States
During Period 1922-1932, Inclusive
(Excluding Federal lands)

(By Years)

Years	Acreage Examined	Ribes Pulled		Cost				Per Acre	
		Wild	Cult.	State	Govt.	Counties	Total	Cost	Ribes
1922	8,012	450,714	-	\$ 26,670.45	-	-	\$ 26,670.45	3.33	56.3
1923	8,734	723,952	19	34,077.51	-	-	34,077.51	3.90	82.9
1924	15,878	1,107,766	112	26,465.20	-	-	26,465.20	1.67	69.8
1925	6,165	270,418	89	9,647.30	-	-	9,647.30	1.56	43.9
1926	18,397	350,621	690	13,541.89	-	-	13,541.89	.736	19.1
1927	14,098	463,853	3,381	12,197.66	-	-	12,197.66	.865	32.9
1928	19,091	600,388	4,340	10,436.52	317.25	-	10,753.77	.563	31.4
1929	45,804	928,105	5,219	23,630.73	-	833.90	24,464.63	.534	20.3
1930	40,738	1,841,654	2,059	30,458.26	125.00	1,112.10	31,695.36	.778	45.2
1931	50,472	1,864,613	2,282	38,298.24	360.56	2,699.92	41,358.72	.819	36.9
1932	43,874	1,327,890	1,326	25,270.96	131.81	1,252.88	26,655.65	.608	30.3
Totals	271,263	9,929,974	19,517	\$250,694.72	\$934.62	\$5,898.80	\$257,528.14	\$.949	36.6

(By States)

States	Acreage Examined	Ribes Pulled		Cost				Per Acre	
		Wild	Cult.	State	Govt.	Counties	Total	Cost	Ribes
N.H.	5,775	317,744	609	\$ 2,768.12	\$360.56	-	\$ 3,128.68	.542	55.0
Vt.	4,068	41,276	220	2,117.96	-	-	2,117.96	.521	10.1
Mass.	73,310	2,211,517	8,749	29,030.36	62.50	-	29,092.86	.397	30.2
R.I.	1,106	6,226	70	162.92	10.64	-	173.56	.157	5.6
Conn.	6,257	17,528	71	774.14	500.92	-	1,275.06	.204	2.8
N.Y.	146,612	4,900,193	8,841	187,508.20	-	\$5,898.80	193,407.00	1.32	33.4
N.E. & N.Y.	237,128	7,494,484	18,558	222,361.70	934.62	5,898.80	229,195.12	.967	31.6
Pa.	34,135	2,435,490	959	28,333.02	-	-	28,333.02	.830	71.3
All States	271,263	9,929,974	19,517	\$250,694.72	\$934.62	\$5,898.80	\$257,528.14	\$.949	36.6

Table 19 - Summary of Total Cooperative Ribes Eradication Work in Northeastern States - 1932

(Initial and Re-eradication)

State	Type of Erad.	Acreage Examined	Ribes Pulled		Cost					Per Acre	
			Wild	Cult.	Indiv.	Towns	State	Govt.	Total	Cost	Ribes
Me.	Initial	49,235	621,264	3,569	1,666.20	4,281.03	2,627.79	754.84	9,329.86	.189	12.6
	Re-Erad.	30,436	287,497	1,157	699.90	3,956.51	2,037.49	591.20	7,285.10	.239	9.4
	Total	79,671	908,761	4,726	2,366.10	8,237.54	4,665.28	1,346.04	16,614.96	.209	11.4
N.H.	Initial	79,924	866,528	1,066	113.89	7,062.07	7,529.00	-	14,704.96	.184	10.8
	Re-Erad.	17,308	208,690	79	174.71	2,105.92	662.34	-	2,942.97	.170	12.1
	Total	97,232	1,075,218	1,145	288.60	9,167.99	8,191.34	-	17,647.93	.182	11.1
Vt.	Initial	7,476	34,525	4,060	1,642.05	328.15	293.59	97.39	2,361.18	.316	4.5
	Re-Erad.	4,373	24,251	697	1,047.67	201.55	135.46	29.68	1,414.36	.323	5.5
	Total	11,849	58,776	4,757	2,689.72	529.70	429.05	127.07	3,775.54	.319	5.0
Mass.	Initial	13,584	106,577	967	971.10	-	1,967.78	257.50	3,196.38	.235	7.8
	Re-Erad.	148,022	227,776	2,104	4,939.67	-	7,848.86	652.50	13,441.03	.091	1.5
	Total	161,606	334,353	3,071	5,910.77	-	9,816.64	910.00	16,637.41	.103	2.1
R.I.	Initial	497	203	214	-	-	195.75	51.00	246.75	.496	0.4
	Re-Erad.	5,975	5,595	75	-	-	1,017.27	401.04	1,418.31	.237	0.93
	Total	6,472	5,798	289	-	-	1,213.02	452.04	1,665.06	.257	0.89
Conn.	Initial	-	-	-	-	-	-	-	-	-	-
	Re-Erad.	7,337	134,456	1,216	192.00	1,633.00	1,394.40	1,373.00	4,592.40	.626	18.3
	Total	7,337	134,456	1,216	192.00	1,633.00	1,394.40	1,373.00	4,592.40	.626	18.3
N.Y.	Initial	145,075	1,223,388	6,198	5,685.77	1,252.88*	42,431.47	-	49,370.12	.340	8.4
	Re-Erad.	10,822	72,265	340	365.77	-	3,751.04	-	4,116.81	.380	6.7
	Total	155,897	1,295,653	6,538	6,051.54	1,252.88*	46,182.51	-	53,486.93	.343	8.3
N.E. & N.Y.	Initial	295,791	2,852,485	16,074	10,079.01	12,924.13*	55,045.38	1,160.73	79,209.25	.268	9.5
	Re-Erad.	224,273	960,530	5,668	7,419.72	7,896.98	16,846.86	3,047.42	35,210.98	.157	4.3
	Total	520,064	3,813,015	21,742	17,498.73	20,821.11*	71,892.24	4,208.15	114,420.23	.220	7.3
Pa.	Initial	20,077	720,925	3,342	596.57	-	4,732.33	511.80	5,840.70	.291	35.9
	Re-Erad.	2,428	57,059	7	18.60	-	1,823.65	4.20	1,846.45	.760	23.5
	Total	22,505	777,984	3,349	615.17	-	6,555.98	516.00	7,687.15	.342	34.6
All States	Initial	315,868	3,573,410	19,416	10,675.58	12,924.13*	59,777.71	1,672.53	85,049.95	.269	11.3
	Re-Erad.	226,701	1,017,589	5,675	7,438.32	7,896.98	18,670.51	3,051.62	37,057.43	.163	4.5
	Total	542,569	4,590,999	25,091	18,113.90	20,821.11*	78,448.22	4,724.15	122,107.38	.225	8.5

*Includes \$1,252.88 county expenditures in New York.

In New England and New York 43.1% of all the Ribes eradication work performed was re-eradication. In Massachusetts the area re-examined for Ribes comprised over 90 per cent of all the work in that state and amounted to 66% of the total re-eradication work in New England and New York during 1932.

Table 20 - Summary of Total Cooperative Ribes Eradication Work in Northeastern States, 1922 - 1932, Inclusive.

(Initial and Re-Eradication)

(By Years)

Y. r	Acreage Examined	Ribes Pulled		Cost						Per Acre	
		Wild	Cult.	Indiv.	Towns	State	Govt.	Counties	Total	Cost	Ribes
1922	475,217	4,849,812	16,061	28,035.13	16,898.68	48,683.94	3,200.90	-	96,818.65	204	10.2
1923	892,639	7,969,917	55,074	40,969.47	40,150.59	76,951.28	2,812.53	-	160,883.87	180	8.9
1924	1,008,042	9,466,271	73,858	44,622.07	48,898.50	71,682.56	3,972.39	-	169,175.52	168	9.4
1925	834,428	7,296,670	59,458	39,720.06	40,351.31	56,251.26	2,169.23	-	138,491.86	166	8.7
1926	814,439	8,838,000	51,471	44,172.88	41,223.95	60,292.28	2,693.80	-	148,382.91	182	10.8
1927	899,626	8,035,476	49,745	49,040.81	38,299.74	64,765.56	3,409.71	-	155,515.82	173	8.9
1928	883,712	6,680,001	60,561	54,667.68	39,038.73	64,329.47	3,311.52	-	161,347.40	183	7.6
1929	931,178	7,569,497	76,442	49,785.39	41,323.28	82,972.66	2,694.11	833.90	177,609.34	191	8.1
1930	709,467	7,946,164	30,962	31,130.24	46,880.12	72,270.65	3,605.42	1,112.10	154,998.53	218	11.2
1931	575,930	7,085,419	21,978	17,746.57	47,455.36	85,896.02	2,892.07	2,699.92	156,689.94	272	12.3
1932	542,569	4,590,999	25,091	18,113.90	19,568.23	78,448.22	4,724.15	1,252.88	122,107.38	225	8.5
Totals	8,567,247	80,328,226	520,701	418,004.20	420,088.49	762,543.90	35,485.83	5,898.80	1,642,021.22	192	9.4

(By States)

State	Acreage Examined	Ribes Pulled		Indiv.	Towns	State	Govt.	Counties	Total	Per Acre	
		Wild	Cult.							Cost	Ribes
Me.	2,594,697	18,683,525	117,511	80,682.45	84,378.71	22,752.03	23,112.85	-	210,926.04	0.81	7.2
N.H.	2,451,943	29,706,819	82,458	38,387.05	322,443.98	100,985.80	360.56	-	462,177.39	1.88	12.1
Vt.	199,765	1,991,503	10,642	65,423.67	1,077.91	11,177.71	981.07	-	78,660.36	3.94	10.0
Mass.	2,031,492	11,113,894	232,916	75,965.55	-	186,795.63	910.00	-	263,671.18	1.30	5.5
R.I.	186,803	119,233	8,105	31.36	-	13,612.64	1,832.80	-	15,476.80	0.83	0.6
Conn.	249,403	1,870,550	22,274	7,116.68	12,187.89	39,758.44	7,242.35	-	66,305.36	2.66	7.5
N.Y.	788,933	14,246,279	41,327	49,126.75	-	359,073.83	15,005,898.80	-	514,114.38	6.52	18.1
N.E. & N.Y.	8,503,036	77,731,803	515,233	416,733.51	420,088.49	734,156.08	34,454.63	5,898.80	1,611,331.51	1.90	9.1
Pa.	64,211	2,596,423	5,468	1,270.69	-	28,387.82	1,031.20	-	30,689.71	4.78	40.4
All States	8,567,247	80,328,226	520,701	418,004.20	420,088.49	762,543.90	35,485.83	5,898.80	1,642,021.22	1.92	9.4

An analysis of the results accomplished on Ribes eradication work during 1932 in comparison with previous year shows that there was a decrease of only 5.8% in acreage worked. However, the acreages cleared of Ribes during the past three years were considerably less than the average for the period 1923-1929, inclusive. This decrease during the past three years may be attributed to the following causes: About 70 per cent of the total control area in New England and New York had been initially worked for Ribes by 1930. Therefore, control activities since that time have been confined chiefly to odd scattered jobs and to Ribes eradication work in backwood towns and on the properties of recalcitrant pine owners. The depression has also been an important factor in causing postponement or curtailment of control projects, especially by less progressive towns and individuals. In Rhode Island, Massachusetts, and Connecticut, a large part of the control work during recent years has been limited to the special projects of eliminating Ribes nigrum and to nursery sanitation. The acreage figures for such work are not included in the summary of regular control projects.

Table 20 - Summary of Total Cooperative Ribes eradication work in Northampton
States, 1922 - 1932, inclusive.

(Initial and Re-Eradication)

(By Year)

Year	States	Initial	Re-Eradication	Total
1922	1,000,000	1,000,000	1,000,000	1,000,000
1923	1,000,000	1,000,000	1,000,000	1,000,000
1924	1,000,000	1,000,000	1,000,000	1,000,000
1925	1,000,000	1,000,000	1,000,000	1,000,000
1926	1,000,000	1,000,000	1,000,000	1,000,000
1927	1,000,000	1,000,000	1,000,000	1,000,000
1928	1,000,000	1,000,000	1,000,000	1,000,000
1929	1,000,000	1,000,000	1,000,000	1,000,000
1930	1,000,000	1,000,000	1,000,000	1,000,000
1931	1,000,000	1,000,000	1,000,000	1,000,000
1932	1,000,000	1,000,000	1,000,000	1,000,000

(By State)

State	Initial	Re-Eradication	Total
1922	1,000,000	1,000,000	1,000,000
1923	1,000,000	1,000,000	1,000,000
1924	1,000,000	1,000,000	1,000,000
1925	1,000,000	1,000,000	1,000,000
1926	1,000,000	1,000,000	1,000,000
1927	1,000,000	1,000,000	1,000,000
1928	1,000,000	1,000,000	1,000,000
1929	1,000,000	1,000,000	1,000,000
1930	1,000,000	1,000,000	1,000,000
1931	1,000,000	1,000,000	1,000,000
1932	1,000,000	1,000,000	1,000,000

1,000,000	1,000,000	1,000,000	1,000,000
1,000,000	1,000,000	1,000,000	1,000,000
1,000,000	1,000,000	1,000,000	1,000,000
1,000,000	1,000,000	1,000,000	1,000,000
1,000,000	1,000,000	1,000,000	1,000,000
1,000,000	1,000,000	1,000,000	1,000,000
1,000,000	1,000,000	1,000,000	1,000,000
1,000,000	1,000,000	1,000,000	1,000,000
1,000,000	1,000,000	1,000,000	1,000,000
1,000,000	1,000,000	1,000,000	1,000,000
1,000,000	1,000,000	1,000,000	1,000,000

An analysis of the results accomplished on Ribes eradication work during 1932 in comparison with previous years shows that there was a decrease of only 5.2% in work. However, the average cleared of Ribes during the past three years was 1.5% less than the average for the period 1922-1929, inclusive. This decrease in the past three years may be attributed to the following causes: About 70 per cent of total control area in New England and New York had been initially worked for Ribes 1922. Therefore, control activities since that time have been confined chiefly to scattered jobs and to Ribes eradication work in backwood towns and on the present neglected areas. The eradication has also been an important factor in the maintenance of control of Ribes, especially by local protective and eradication. In Rhode Island, Massachusetts, and Connecticut, a large part of

SUMMARY OF REGULAR RIBES ERADICATION WORK IN NORTHEASTERN STATES 1918-1932 Incl.

(INITIAL AND RE ERADICATION WORK)

STATE	Year 1918						Year 1919						Year 1920						Year 1921						Totals 1918 - 1921																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
	Acres		No. Ribes		Total		Per Acre		Acres		No. Ribes		Total		Per Acre		Acres		No. Ribes		Total		Per Acre		Acres		No. Ribes		Total		Per Acre		Cost		Total																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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STATE	Year 1922					Year 1923					Year 1924					Year 1925					Year 1926				
	No. Ribes		Per Acre		Total Cost	No. Ribes		Per Acre		Total Cost	No. Ribes		Per Acre		Total Cost	No. Ribes		Per Acre		Total Cost	No. Ribes		Per Acre		Total Cost
	Acres	Wild	Cult.	Cost		Acres	Wild	Cult.	Cost		Acres	Wild	Cult.	Cost		Acres	Wild	Cult.	Cost		Acres	Wild	Cult.	Cost	
MAINE	190,209	449,287	3,680	8,012.48	.042	2.3	336,452	1,209,282	12,095	19,333.16	.057	3.6	401,227	1,846,957	11,599	23,093.91	.057	4.6	274,678	17,101.015	15,041	20,257.62	.073	6.2	21,280.01
N.H.	178,489	1,816,829	9,061	28,706.64	.161	10.2	268,737	3,496,733	24,779	51,651.48	.192	13.3	326,458	4,037,011	14,989	52,837.85	.165	12.4	261,244	3,244,332	6,402	44,614.97	.170	12.4	45,451.75
V.T.	13,512	201,906	812	6,150.24	.455	15.0	25,190	278,570	1,234	8,498.43	.337	11.0	25,688	182,154	592	9,280.02	.361	7.1	26,622	317,837	6,400	9,088.12	.340	11.9	10,253.44
MASS.	64,302	1,578,294	2,368	13,375.09	.208	24.5	201,931	1,776,107	14,887	28,411.92	.14	7.8	159,776	2,025,036	38,777	34,172.98	.217	12.6	195,201	751,830	33,610	21,759.45	.111	3.8	27,281.37
R.I.	11,500	11,764	132	1,840.00	.160	1.0	31,308	14,275	1,444	1,895.96	.04	0.45	52,480	24,711	2,953	2,302.01	.044	.5	25,640	4,994	1,928	1,519.04	.059	0.2	1,924.23
CONN.	6,175	137,501	0	4,651.50	.753	27.2	14,062	288,333	2,418	6,863.14	.488	20.5	17,215	289,034	2,447	5,981.73	.347	16.7	16,106	272,797	6,04	5,495.30	.341	16.9	5,062.35
N.Y.	11,030	654,731	0	34,082.70	3.09	59.3	15,459	906,617	3,67	44,229.78	2.87	57.3	25,198	1,061,368	2,501	40,907.02	1.62	42.1	34,937	994,865	1,153	35,787.36	1,024	20.4	37,129.76
TOTALS	475,217	4,849,812	16,061	96,818.65	.204	10.2	892,639	7,969,917	55,074	160,883.87	.18	8.9	1,008,042	9,466,271	73,858	169,175.52	.168	9.4	834,428	7,296,670	59,450	138,491.86	.166	8.7	148,382.91

STATE	Year 1927					Year 1928					Year 1929					Year 1930					Year 1931				
	No. Ribes		Per Acre		Total Cost	No. Ribes		Per Acre		Total Cost	No. Ribes		Per Acre		Total Cost	No. Ribes		Per Acre		Total Cost	No. Ribes		Per Acre		Total Cost
	Acres	Wild	Cult.	Cost		Acres	Wild	Cult.	Cost		Acres	Wild	Cult.	Cost		Acres	Wild	Cult.	Cost		Acres	Wild	Cult.	Cost	
MAINE	261,481	2,601,639	10,225	22,513.71	.086	9.9	203,067	1,595,792	8,778	22,597.90	.111	7.9	233,543	2,090,340	18,244	20,988.98	.090	9.0	195,123	1,883,836	10,573	19,375.04	.099	9.7	16,888.27
N.H.	225,793	2,660,816	2,510	40,970.11	.182	11.8	278,530	2,302,538	5,220	40,844.96	.179	10.1	252,144	2,102,999	6,644	40,609.40	.161	8.3	274,870	2,840,230	3,197	48,596.21	.216	12.6	50,246.09
V.T.	19,405	280,781	314	8,233.95	.424	14.4	16,767	159,340	196	6,886.37	.401	9.5	13,300	110,671	453	6,495.47	.488	8.3	13,122	94,611	108	5,903.71	.450	7.2	280,16.9
MASS.	299,353	906,490	32,760	27,940.03	.093	3.1	242,933	523,400	34,153	29,769.26	.173	2.2	264,840	841,759	32,881	32,486.51	.123	3.2	136,791	1,024,371	8,155	18,120.33	.132	7.5	4,125.07
R.I.	9,735	22,279	521	1,700.86	.175	2.3	21,461	17,777	615	2,629.64	.119	0.83	-	-	-	-	-	-	-	-	-	-	-	-	-
CONN.	20,904	152,825	1,208	8,633.20	.413	7.3	75,105	123,385	1,364	8,013.84	.107	1.6	34,597	134,407	10,922	8,034.54	.232	3.9	29,595	44,159	3,595	4,241.46	.143	1.5	4,735.90
N.Y.	62,955	1,410,646	2,207	45,523.96	.723	22.4	95,849	1,957,769	10,235	50,605.43	.528	20.4	177,756	1,982,671	7,745	65,466.48	.512	15.5	98,721	1,402,189	4,471	50,130.30	.510	14.3	56,764.66
SUB-TOTALS N.E. + N.Y.	899,626	8,035,476	49,745	155,515.82	.173	8.9	883,712	6,680,001	60,561	161,347.40	.183	7.6	926,180	7,262,847	75,889	174,051.38	.188	7.8	697,722	7,289,396	30,099	146,367.05	.210	10.4	145,876.82
Pa.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ALL STATES	899,626	8,035,476	49,745	155,515.82	.173	8.9	883,712	6,680,001	60,561	161,347.40	.183	7.6	926,180	7,262,847	75,889	174,051.38	.188	7.8	697,722	7,289,396	30,099	146,367.05	.210	10.4	145,876.82

STATE	Year 1932						Totals 1922 - 1932						Grand Totals 1918-1932					
	No. Ribes		Total Cost	Acres	No. Ribes		Total Cost	Per Acre		Acres	No. Ribes		Total Cost	Per Acre				
	Wild	Cult.			Cost	Ribes		Wild	Cult.		Cost	Ribes						
														Cost	Ribes	Cost	Ribes	
MAINE	79,671	908,761	4726	16,614.96	.209	11.4	2,594,697	18,683,525	117,511	210,926.04	.081	7.2	2,775,327	19,342,254	119,090	230,634.18	.083	7.0
N.H.	97,232	1,075,218	1145	17,647.93	.182	11.1	2,451,943	29,706,819	82,458	462,177.39	.188	12.1	3,022,848	36,042,509	143,975	583,317.93	.193	11.9
V.T.	11,849	58,776	4757	3,775.94	.319	5.0	199,765	1,991,503	10,642	78,640.36	.394	10.0	217,743	2,263,646	10,924	92,912.87	.427	10.4
MASS.	161,606	334,353	3071	16,637.41	.103	2.1	2,031,492	11,113,894	232,916	263,671.18	.130	5.5	2,113,369	13,528,767	243,261	308,346.08	.146	6.4
R.I.	6,472	5798	289	1,665.06	.257	0.87	186,803	119,233	8105	15,476.80	.083	0.64	290,064	200,475	12,356	32,238.35	.111	0.69
CONN.	7,337	134,456	1216	4,592.40	.626	18.3	249,403	1,870,550	22,274	66,305.36	.266	7.5	262,873	1,995,813	22,282	73,667.47	.280	7.6
N.Y.	155,897	1,295,653	6538	53,486.93	.343	8.3	788,933	14,246,279	41,327	514,114.38	.652	18.1	863,085	19,361,217	55,070	716,127.29	.830	22.4
SUB-TOTALS N.E. + N.Y.	520,064	3,813,015	21,742	114,420.23	.220	7.3	8,503,036	77,731,803	515,233	1,611,331.51	.190	9.1	9,545,309	92,734,681	606,958	2,037,244.17	.213	9.7
Pa.	22,505	777,984	3,349	7,687.15	.342	34.6	64,211	2,596,423	5,468	30,609.71	.478	40.4	64,211	2,596,423	5,468	30,609.71	.478	40.4
ALL STATES	542,569	4,590,999	25,091	122,107.38	.225	8.5	8,567,247	80,328,226	520,701	1,642,021.22	.192	9.4	9,609,520	95,331,104	612,426	2,067,933.88	.215	9.9

Note No Regular Ribes Eradication Work was performed in Penn - sylvania prior to 1929

Unemployment Relief Through Blister Rust Control Work
in Northeastern States - 1932

During 1932 relief labor was used for the first time on blister rust control. This forest protection work is especially suited to unemployment relief since most of the expenditures are for labor rather than equipment. The results of the Ribes eradication work performed in connection with this project during 1932 are summarized in Table 21.

Table 21 - Ribes eradication performed in Northeastern States during 1932
in connection with unemployment relief.

State	Cooperating Agencies	No. Men Employed	No. Man Days Labor	Funds Expended	Acreage Eradicated of Ribes	No. Ribes Pulled
Me.	9 Towns	66	1,737	\$5,459.17**	6,059	292,364
Vt.	2 Towns	25	166	555.50	1,275	9,959
Mass.	2 Water Works*	10	385	1,468.40	10,212	112,403
N.Y.	Saratoga State Park	14	61	242.00	927	2,051
Totals	-	115	2,349	\$7,725.07	18,473	416,777

*Springfield and Metropolitan Boston.

**Includes \$1,807.57 spent by state on this work.

These data are included in the preceding tables summarizing the regular control work.

Unemployment Relief Work in Eastern States - 1935

During 1935 relief labor was used for the first time on relief work control. This relief work is especially suited to unemployment relief work and the expenditures are for labor rather than equipment. The results of the relief work are summarized in connection with this project during 1935 are summarized in Table 3.

Table 3 - Relief Work in Eastern States during 1935
in connection with unemployment relief.

State	Population	No. of Men Employed	No. of Men Days	Value of Work	Value of Materials	Total Value
Del.	2 towns	66	1,137	\$2,459.17*	6.00	\$2,465.17
Pa.	2 towns	52	122	\$25.70	1.37	\$27.07
W. Va.	2 towns	10	38	1,423.40	10.12	1,433.52
N. C.	Eastern State	14	61	\$45.00	3.27	\$48.27
Total	-	112	1,298	\$1,753.27	10.76	\$1,764.03

*Includes \$1,207.57 spent by state on this work.
*Includes \$1,207.57 spent by state on this work.

These data are included in the preceding tables summarizing the relief control work.

Table 22.- Classification of Blister Rust Control Funds Used on Regular Cooperative Ribes Eradication Work in Northeastern States During 1932

(Not including special nursery sanitation and black currant eradication work)

State	Individuals	Towns	Counties	State Blister Rust Appropriation	Other State Appropriation	Federal Funds	Totals
Me.	\$ 2,366.10	\$ 8,237.54	-	\$ 4,665.28	-	\$1,346.04	\$ 16,614.96
N.H.	288.60	9,167.99	-	8,191.34	-	-	17,647.93
Vt.	2,689.72	529.70	-	429.05	-	127.07	3,775.54
Mass.	5,910.77	-	-	9,371.74	\$ 444.90	910.00	16,637.41
R.I.	-	-	-	1,213.02	-	452.04	1,665.06
Conn.	192.00	1,633.00	-	1,358.40	36.00	1,373.00	4,592.40
N.Y.	6,051.54	-	\$1,252.88	40,186.41	5,996.10	-	53,486.93
N.E. & N.Y.	17,498.73	19,568.23	1,252.88	65,415.24	6,477.00	4,208.15	114,420.23
Pa.	615.17	-	-	6,555.98	-	516.00	7,687.15
All States	\$18,113.90	\$19,568.23	\$1,252.88	\$71,971.22	\$6,477.00	\$4,724.15	\$122,107.38

The funds spent on the cooperative Ribes eradication project were for laborers, scouts, linemen, and foremen. The cost of the state checkers in New Hampshire and the eradication assistants in New York and Pennsylvania are not included in this project.

The total cost of the cooperative Ribes eradication work (\$122,107.38) represents 43.8 per cent of all state and Federal expenditures on all blister rust control projects in the Northeastern States during 1932.

Percentage of Total State and Federal Funds, in Respective States, Derived from Various Sources and Expended on the Project "Ribes Eradication."

State	Individuals	Towns	Counties	State Blister Rust Appropriation	Other State Appropriation	Federal Funds*	Totals
Me.	14.2	49.6	-	28.1	-	8.1	100.0
N.H.	1.6	52.0	-	46.4	-	-	100.0
Vt.	71.2	14.0	-	11.4	-	3.4	100.0
Mass.	35.5	-	-	56.3	2.7	5.5	100.0
R.I.	-	-	-	72.9	-	27.1	100.0
Conn.	4.2	35.5	-	29.6	0.8	29.9	100.0
N.Y.	11.3	-	2.4	75.1	11.2	-	100.0
N.E. & N.Y.	15.3	17.1	1.1	57.2	5.6	3.7	100.0
Pa.	8.0	-	-	85.3	-	6.7	100.0
All States	14.8	16.0	1.0	59.0	5.3	3.9	100.0

*Used for Ribes scouting.

Table 22 - Classification of Elmer Fruit Control Funds Used on Elmer Cooperative Elmer Fruit Control Work in Northern States During 1932

(Not including special nursery acquisition and black current eradication work)

State	Elmer Fruit Control Association	Other State	Elmer Fruit Control Association	Other State	Elmer Fruit Control Association	Other State
Ala.	1,527.70	-	1,527.70	-	1,527.70	-
Ark.	1,167.99	-	1,167.99	-	1,167.99	-
Cal.	222.70	-	222.70	-	222.70	-
Col.	-	-	-	-	-	-
Conn.	-	-	-	-	-	-
Del.	1,677.00	-	1,677.00	-	1,677.00	-
Fla.	-	-	-	-	-	-
Ill.	1,527.70	-	1,527.70	-	1,527.70	-
Ind.	-	-	-	-	-	-
Iowa	1,527.70	-	1,527.70	-	1,527.70	-
Kent.	-	-	-	-	-	-
La.	-	-	-	-	-	-
Mass.	1,527.70	-	1,527.70	-	1,527.70	-
Mich.	-	-	-	-	-	-
Minn.	1,527.70	-	1,527.70	-	1,527.70	-
Mo.	-	-	-	-	-	-
N.H.	-	-	-	-	-	-
N.J.	-	-	-	-	-	-
N.Y.	-	-	-	-	-	-
Ohio	1,527.70	-	1,527.70	-	1,527.70	-
Ore.	-	-	-	-	-	-
Penn.	1,527.70	-	1,527.70	-	1,527.70	-
R.I.	-	-	-	-	-	-
S.D.	-	-	-	-	-	-
Tenn.	-	-	-	-	-	-
Va.	-	-	-	-	-	-
Wash.	-	-	-	-	-	-
W. Va.	-	-	-	-	-	-
Wis.	1,527.70	-	1,527.70	-	1,527.70	-
Wyo.	-	-	-	-	-	-
Total	14,527.70	-	14,527.70	-	14,527.70	-

The above amount on the cooperative Elmer eradication project were for laboratory, accounts, traveling, and for other. The cost of the state checks in New Hampshire and the eradication residents in New York and Pennsylvania are not included in this project.

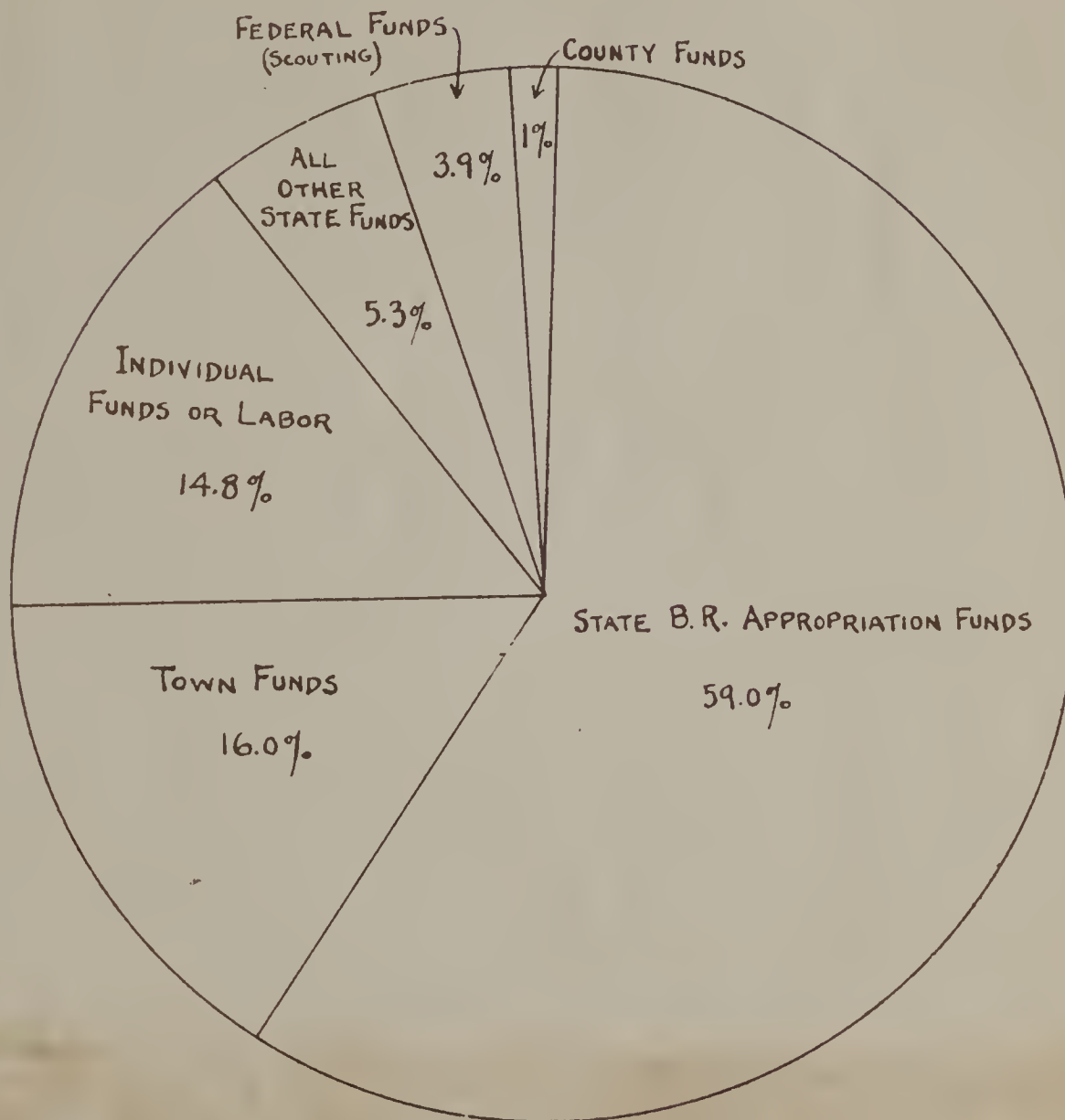
The total cost of the cooperative Elmer eradication with (14,527.70) represents 47.2 per cent of all state and federal expenditures on all Elmer fruit control projects in the Northern States during 1932.

Percentage of Total State and Federal Funds, in Percentage States, Derived from Various Sources and Turned on the Project "Elmer Eradication."

State	Elmer Fruit Control Association	Other State	Elmer Fruit Control Association	Other State	Elmer Fruit Control Association	Other State
Ala.	10.6	-	10.6	-	10.6	-
Ark.	15.0	-	15.0	-	15.0	-
Cal.	14.0	-	14.0	-	14.0	-
Col.	-	-	-	-	-	-
Conn.	-	-	-	-	-	-
Del.	-	-	-	-	-	-
Fla.	25.2	-	25.2	-	25.2	-
Ill.	11.1	-	11.1	-	11.1	-
Ind.	17.1	-	17.1	-	17.1	-
Iowa	-	-	-	-	-	-
Kent.	-	-	-	-	-	-
La.	-	-	-	-	-	-
Mass.	18.0	-	18.0	-	18.0	-
Mich.	-	-	-	-	-	-
Minn.	-	-	-	-	-	-
Mo.	-	-	-	-	-	-
N.H.	-	-	-	-	-	-
N.J.	-	-	-	-	-	-
N.Y.	-	-	-	-	-	-
Ohio	18.0	-	18.0	-	18.0	-
Ore.	-	-	-	-	-	-
Penn.	18.0	-	18.0	-	18.0	-
R.I.	-	-	-	-	-	-
S.D.	-	-	-	-	-	-
Tenn.	-	-	-	-	-	-
Va.	-	-	-	-	-	-
Wash.	-	-	-	-	-	-
W. Va.	-	-	-	-	-	-
Wis.	18.0	-	18.0	-	18.0	-
Wyo.	-	-	-	-	-	-
Total	14.5	-	14.5	-	14.5	-

Notes for Elmer eradication.

SOURCE OF TOTAL FUNDS SPENT ON REGULAR RIBES ERADICATION WORK
IN NORTHEASTERN STATES DURING 1932.



TOTAL COST OF RIBES ERADICATION - \$122,107.38

Federal Control Projects

Control measures are being applied as rapidly as funds permit on the white pine areas in the National Forests and Parks in the Northeastern States that are of sufficient value to justify the cost of protection. Such work has been conducted as a strictly federal project, the Bureau of Plant Industry cooperating with the National Park Service and the Forest Service. The project at Acadia National Park was begun in 1929 and has been continued each succeeding year. The initial control work will be completed on this Park during 1933. All of the important white pine areas on the White Mountain National Forest were initially eradicated of Ribes during the period 1924-1931, inclusive. The Heart's Content area on the Allegheny National Forest in Pennsylvania was initially cleared of Ribes in 1929 and re-eradicated in 1931. During 1932, an area of 135 acres on the Hazelwood Oil Company tract was cleared of Ribes to protect a valuable stand of white pine comprising approximately 40 acres. The most likely Ribes sites on the Heart's Content area will be re-worked during 1933 and initial protection will be extended to the white pines around two camp sites on this Forest.

None of the control work on National Forests and Parks has been included in the Ribes eradication summaries, except 395 acres eradicated of 39,937 wild Ribes on the White Mountain National Forest during 1931, at a cost of \$360.56 to the Forest Service and \$90.14 to the State of New Hampshire. This work was performed under the supervision of Agent Kane.

Table 23.- Summary of Regular Ribes Eradication Work in Connection With Federal Projects on Government Owned Lands in Northeastern States

1932*

Project	Acreage Examined	Ribes Pulled			Cost			Per Acre	
		Wild	Cult.	B.P.I.	Forest Service	Park Service	Total	Cost	Ribes
Acadia National Park	1,916	114,225	-	137.76	-	2,514.27	2,652.03	1.38	59.6
Allegheny National Forest	135	81,102	-	50.40	173.60	-	224.00	1.66	600.8
Total	2,051	195,327	-	188.16	173.60	2,514.27	2,876.03	1.40	95.2

*All initial eradication.

1924 to 1932, Inclusive.

Project	Type of Work	Acreage Examined	Ribes Pulled				Cost			Per Acre	
			Wild	Cult.	B.P.I.	State	Forest Service	Park Service	Total	Cost	Ribes
Acadia National Park, Me.	All Initial	7,726	503,920	-	3,145.83	-	-	8,345.53	11,491.36	1.49	65.2
White Mt. National Forest, N.H.	Strictly Federal Projects	6,384	142,556	-	75.63	133.97	1,111.06	-	1,320.66	.207	22.3
	Included in state summaries	395	39,937	-	-	90.14	360.56	-	450.70	1.14	101.1
	Total - All Initial	6,779	182,493	-	75.63	224.11	1,471.62	-	1,771.36	.261	26.9
Allegheny National Forest, Pa.	Initial	596	104,122	8	112.20	-	310.10	-	422.30	.709	174.7
	Re-Erad.	461	13,321	-	44.69	-	168.70	-	213.39	.463	28.9
	Total	1,057	117,443	8	156.89	-	478.80	-	635.69	.601	111.1
Totals	Initial	15,101	790,535	8	3,333.66	224.11	1,781.72	8,345.53	13,685.02	.906	52.3
	Re-Erad.	461	13,321	-	44.69	-	168.70	-	213.39	.463	28.9
	Total	15,562	803,856	8	3,378.35	224.11	1,950.42	8,345.53	13,898.41	.893	51.7

No control work was performed on government lands in the Northeastern States prior to 1924.

Table 27 - Summary of Federal River Protection Work in Connecticut, 1952
Federal Projects on Government Owned Lands in Connecticut States

1952

Project	Acres	Estimated Cost	Federal Aid	State Aid	Local Aid	Total
1. New Britain River	1,000	100,000	50,000	25,000	25,000	100,000
2. Middletown River	1,000	100,000	50,000	25,000	25,000	100,000
3. Meriden River	1,000	100,000	50,000	25,000	25,000	100,000
4. Waterbury River	1,000	100,000	50,000	25,000	25,000	100,000
5. Danbury River	1,000	100,000	50,000	25,000	25,000	100,000
6. Shelton River	1,000	100,000	50,000	25,000	25,000	100,000
7. Wallingford River	1,000	100,000	50,000	25,000	25,000	100,000
8. Southington River	1,000	100,000	50,000	25,000	25,000	100,000
9. Plainville River	1,000	100,000	50,000	25,000	25,000	100,000
10. Berlin River	1,000	100,000	50,000	25,000	25,000	100,000

Estimated 1952

1952 to 1953

Project	Acres	Estimated Cost	Federal Aid	State Aid	Local Aid	Total
1. New Britain River	1,000	100,000	50,000	25,000	25,000	100,000
2. Middletown River	1,000	100,000	50,000	25,000	25,000	100,000
3. Meriden River	1,000	100,000	50,000	25,000	25,000	100,000
4. Waterbury River	1,000	100,000	50,000	25,000	25,000	100,000
5. Danbury River	1,000	100,000	50,000	25,000	25,000	100,000
6. Shelton River	1,000	100,000	50,000	25,000	25,000	100,000
7. Wallingford River	1,000	100,000	50,000	25,000	25,000	100,000
8. Southington River	1,000	100,000	50,000	25,000	25,000	100,000
9. Plainville River	1,000	100,000	50,000	25,000	25,000	100,000
10. Berlin River	1,000	100,000	50,000	25,000	25,000	100,000

In Connecticut, the Federal Government has been authorized to provide financial assistance for the construction of river and harbor projects. This assistance is provided in the form of grants and loans. The Federal Government has authorized a total of \$100,000,000 for river and harbor projects in Connecticut for the period 1952 to 1953.

Table 24.- Summary of All Regular Ribes Eradication Work in Northeastern States
(Cooperative work and Federal projects)

State	Period	Acreage Examined	Ribes Pulled		Total Cost	Per Acre	
			Wild	Cult.		Cost	Ribes
Me.	1932	81,587	1,022,986	4,726	\$ 19,266.99	\$.236	12.5
	1922-1932	2,602,423	19,187,445	117,511	222,417.40	.085	7.4
	1918-1932	2,783,053	19,846,174	119,090	242,125.54	.087	7.1
N.H.	1932	97,232	1,075,218	1,145	17,647.93	.182	11.1
	1922-1932	2,458,327	29,849,375	82,458	463,498.05	.189	12.1
	1918-1932	3,029,232	36,185,065	143,975	584,638.59	.193	11.9
Vt.	1932	11,849	58,776	4,757	3,775.54	.319	5.0
	1922-1932	199,765	1,991,503	10,642	78,660.36	.394	10.0
	1918-1932	217,743	2,263,646	10,924	92,912.87	.427	10.4
Mass.	1932	161,606	334,353	3,071	16,637.41	.103	2.1
	1922-1932	2,031,492	11,113,894	232,916	263,671.18	.130	5.5
	1918-1932	2,113,369	13,528,767	243,261	308,346.08	.146	6.4
R.I.	1932	6,472	5,798	289	1,665.06	.257	0.89
	1922-1932	186,803	119,233	8,105	15,476.80	.083	0.64
	1918-1932	290,064	200,475	12,356	32,238.35	.111	0.69
Conn.	1932	7,337	134,456	1,216	4,592.40	.626	18.3
	1922-1932	249,403	1,870,550	22,274	66,305.36	.266	7.5
	1918-1932	262,873	1,995,813	22,282	73,667.47	.280	7.6
N.Y.	1932	155,897	1,295,653	6,538	53,486.93	.343	8.3
	1922-1932	788,933	14,246,279	41,327	514,114.38	.652	18.1
	1918-1932	863,085	19,361,217	55,070	716,127.29	.830	22.4
N.E. & N.Y.	1932	521,980	3,927,240	21,742	117,072.26	.224	7.5
	1922-1932	8,517,146	78,378,279	515,233	1,624,143.57	.191	9.2
	1918-1932	9,559,419	93,381,157	606,958	2,050,056.19	.215	9.8
Pa.	1932	22,640	859,086	3,349	7,911.15	.349	37.9
	1922-1932	65,268	2,713,866	5,476	31,325.40	.480	41.6
	1918-1932	65,268	2,713,866	5,476	31,325.40	.480	41.6
All States	1932	544,620	4,786,326	25,091	124,983.41	.229	8.8
	1922-1932	8,582,414	81,092,145	520,709	1,655,468.93	.193	9.4
	1918-1932	9,624,687	96,095,023	612,434	\$2,081,381.59	\$.216	10.0

(Continued from page 10)

Table 25 - Status of Regular Ribes Eradication Work in Northeastern States -
December 1932

(Initial Work)

State	Acreage of Control Area			Acreage Worked *			Per Cent Worked		Acreage Still to be Worked		
	White Pine	Protection Zones	Total	White Pine	Protection Zones	Total	White Pine incor- trol area	Total Pine Con- trol area	White Pine	Protection Zones	Total
Me.	1,781,062	2,340,209	4,121,271	1,185,866	1,559,194	2,745,060	66.6	66.6	595,196	781,015	1,376,211
N.H.	1,544,033	1,635,475	3,179,508	1,296,173	1,370,849	2,667,022	83.9	83.9	247,860	264,626	512,486
Vt.	120,782	181,172	301,954	74,754	112,132	186,886	61.9	61.9	46,028	69,040	115,068
Mass.	932,564	855,528	1,788,092	923,699	847,393	1,771,092	99.0	99.0	8,865	8,135	17,000
R.I.	73,196	199,983	273,179	73,196	199,983	273,179	100.0	100.0	0	0	0
Conn.	139,977	99,573	239,550	134,134	95,416	229,550	95.8	95.8	5,843	4,157	10,000
N.Y.	829,352	552,902	1,382,254	489,217	326,144	815,361	59.0	59.0	340,135	226,758	566,893
N.E. & N.Y.	5,420,966	5,864,842	11,285,808	4,177,039	4,511,111	8,688,150	77.1	77.0	1,243,927	1,353,731	2,597,658
N.J.	1,350	2,025	3,375	0	0	0	0	0	1,350	2,025	3,375
Pa.	217,998	326,997	544,995	24,573	36,859	61,432	11.3	11.3	193,425	290,138	483,563
All States	5,640,314	6,193,864	11,834,178	4,201,612	4,547,970	8,749,582	74.5	73.9	1,438,702	1,645,894	3,084,596

(Re-eradication)

State	Acreage of Control Area			Acreage Re-worked *			Per Cent Re-worked		Acreage Still to be Re-worked		
	White Pine	Protection Zones	Total	White Pine	Protection Zones	Total	White Pine incor- trol area	Total Pine Con- trol Area	White Pine	Protection Zones	Total
Me.	1,781,062	2,340,209	4,121,271	16,417	21,576	37,993	0.9	0.9	1,764,645	2,318,633	4,083,278
N.H.	1,544,033	1,635,475	3,179,508	176,034	186,176	362,210	11.4	11.4	1,367,999	1,449,299	2,817,298
Vt.	120,782	181,172	301,954	12,343	18,514	30,857	10.2	10.2	108,439	162,658	271,097
Mass.	932,564	855,528	1,788,092	178,669	163,608	342,277	19.1	19.1	753,895	691,920	1,445,815
R.I.	73,196	199,983	273,179	4,525	12,360	16,885	6.2	6.2	68,671	187,623	256,294
Conn.	139,977	99,573	239,550	19,471	13,852	33,323	13.9	13.9	120,506	85,721	206,227
N.Y.	829,352	552,902	1,382,254	28,634	19,090	47,724	3.5	3.5	800,718	533,812	1,334,530
N.E. & N.Y.	5,420,966	5,864,842	11,285,808	436,093	435,176	871,269	8.0	7.7	4,984,873	5,429,666	10,414,539
N.J.	1,350	2,025	3,375	0	0	0	0	0	1,350	2,025	3,375
Pa.	217,998	326,997	544,995	1,534	2,302	3,836	0.7	0.7	216,464	324,695	541,159
All States	5,640,314	6,193,864	11,834,178	437,627	437,478	875,105	7.8	7.4	5,202,687	5,756,386	10,959,073

*Excludes nursery sanitation projects.

From 1913 to 1917

(not dated - 95)

[illegible]

...for the

The control area in each state comprises the area initially cleared of Ribes (pine area and protection zones) plus the estimated acreage still in need of such work. The latter is based on township estimates made by the blister rust control agents, except in the following instances where the estimates were made by the Boston Office. The control area outside the agents' districts in Maine was estimated to include the acreage of all pure pine and mixed pine (30-79% pine in mixture) plus an additional acreage for protection zones equivalent to 30% of this pine area. In Pennsylvania and New Jersey control area was assumed to be composed of 40% pine acreage (pure pine and mixed (21-79%) pine) and 60% protection zones. The control area in each state is considered the same size for both the initial and re-eradication work.

In all the Northeastern States, except Vermont and New York, the acreages of white pine are based on data secured during the cartographical survey. In these two states the acreages were estimated as 40% and 60%, respectively, of the control area. The following basis was used in the other states for estimating the white pine acreages in the control areas:

Connecticut - total acreage of pure and mixed (30-79%) pine.

Maine - total pine acreage in agents' districts plus acreage of pure and mixed (30-79%) pine outside agents' districts.

Massachusetts - total pine acreage excluding those towns in Suffolk, Barnstable, Essex and Middlesex Counties, where no control work is planned.

New Hampshire and Rhode Island - total pine acreage in each state. (The control area in Rhode Island also includes considerable potential pine land).

New Jersey and Pennsylvania - Total acreage of pure and mixed (21-79%) white pine.

The acreages of white pine in the total area worked or re-worked were computed on the basis of their being the same proportion as the white pine in the total control area in each state.

The control area in each state comprises the area initially cleared of white pine (pine tree and protection areas) plus the estimated acreage still in need of such work. The latter is based on township estimates made by the District Forest Control Agents, except the following instances where the estimates were made by the Forest Office. The control area outside the agents' districts in Maine was estimated to include the acreage of all pure pine and mixed pine (30-70% pine in mixture) plus an additional acreage for protection areas equivalent to 30% of this pine area. In Pennsylvania and New Jersey the control area was assumed to be composed of 40% pine acreage (pure pine and mixed 20-70% pine) and 60% protection areas. The control area in each state is considered as one size for both the initial and re-examination work.

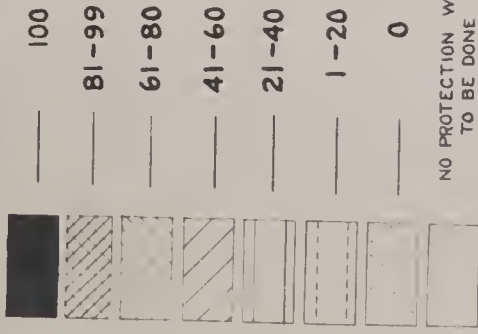
In all the Northern States, except Vermont and New York, the acreage of white pine was based on data secured during the cartographic survey. In these two states the acreage was estimated as 40% and 60%, respectively, of the control area. The following basis was used in the other states for estimating the white pine acreage in the control areas:

- Connecticut - total acreage of pure and mixed (30-70%) pine.
 - Maine - total pine acreage in agents' districts plus acreage of pure and mixed (30-70%) pine outside agents' districts.
 - Massachusetts - total pine acreage excluding those towns in Suffolk, Barnstable, Essex and Middlesex Counties, where no control work is planned.
 - New Hampshire and Rhode Island - total pine acreage in each state. (The control area in Rhode Island also includes considerable potential pine land).
 - New Jersey and Pennsylvania - Total acreage of pure and mixed (20-70%) white pine.
- The acreage of white pine in the total area worked or re-worked was computed on the basis of their being the same proportion as the white pine in the total control area in each state.

STATUS OF INITIAL RIBES ERADICATION WORK IN NEW ENGLAND AND NEW YORK DECEMBER 1932

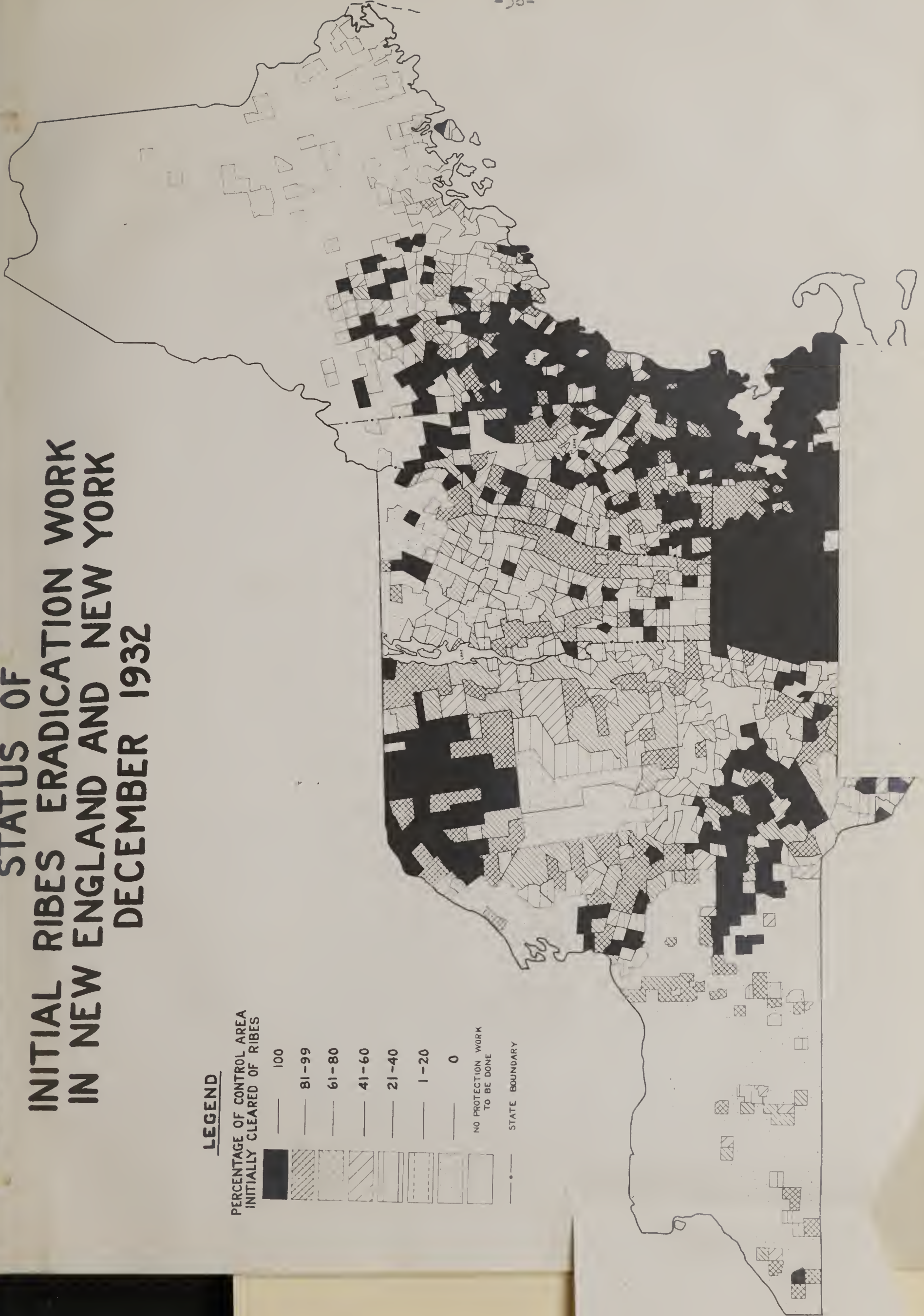
LEGEND

PERCENTAGE OF CONTROL AREA
INITIALLY CLEARED OF RIBES



NO PROTECTION WORK
TO BE DONE

STATE BOUNDARY



SPECIAL CONTROL WORK

Special control work consists of the nursery sanitation and black currant eradication projects. Since 1929, a separate record has been kept of the Ribes eradication work in connection with the protection of white pines in the nurseries. Prior to 1930, such control work was included in the regular Ribes eradication summaries.

Nursery Sanitation

White pines must be grown under absolutely sanitary conditions, as regards Ribes, in order to prevent infection from blister rust. Therefore, it is essential that the white pine stock in each nursery be protected by eradicating all Ribes within 1500 feet and all European black currants from within one mile. All of the Northeastern States, except Rhode Island, have state nurseries growing white pines. Control of the disease has been established and is being maintained in all of these nurseries. Most of the commercial pine growing nurseries are located in Massachusetts, Connecticut, New York, New Jersey, and Pennsylvania. In the other Northeastern States there are only a few such nurseries producing white pines. Sanitation zones have been established around most of the important commercial nurseries in New England. Control work around the private nurseries in New York has been limited due to the relatively few white pines grown and the abundance of cultivated Ribes within the prescribed sanitation zones which would necessitate a large expenditure by the nurserymen for compensation if these bushes were removed. According to the present state blister rust law in New York, effective February 17, 1930, no compensation shall be paid by the state for any species of Ribes destroyed in connection with the establishment of Ribes-free zones around commercial nurseries, but fair compensation must be paid for such bushes by the person owning or operating the protected nursery. None of the commercial nurseries growing white pine in New Jersey and Pennsylvania have established sanitation zones, but action is now being taken to extend protection to the most important of these nurseries. A survey is being made of the Pennsylvania nurseries to determine the amount of white pine being grown and the need for control work.

Table 26 - Status of Nursery Sanitation Work - December 1932

State	No. Nurseries Growing White Pine				No. Nurseries Protected From Blister Rust			
	Reforestation Stock Only	Ornamental Stock Only	Both	Total	Reforestation Stock Only	Ornamental Stock Only	Both	Total
Me.	2	3	5	10	2	1	3(a)	6
N.H.	1	2	2	5	1	2	2	5
Vt.	1	2	-	3	1	-	-	1
Mass.	6	15	4	25	6	11	3	20
R.I.	-	11	-	11	-	6	-	6
Conn.	1	8	6	15	1	4(b)	4(c)	9
N.Y.	7	262	1	270	7	-	1	8
N.E. & N.Y.	18	303	18	339	18	24	13	55
N.J.	1	86	-	87	1	-	-	1
Pa.	4	100 est.	-	104	4	-	-	4
Total	23	489	18	530	23	24	13	60

RECORD CONTROL WORK

Special control work consists of the nursery sanitation and black control-
 association projects. Since 1929, a separate record has been kept of the Ribes erad-
 ication work in connection with the protection of white pines in the nurseries. Prior
 to 1930, such control work was included in the regular Ribes eradication summaries.

Nursery Sanitation

White pines must be grown under absolutely sanitary conditions, as regards Ribes,
 in order to prevent infection from blight rust. Therefore, it is essential that the
 white pine stock in each nursery be protected by eradicating all Ribes within 1500 feet
 and all European black currants from within one mile. All of the Northwestern States,
 except Rhode Island, have state nurseries growing white pines. Control of the disease
 has been established and is being maintained in all of these nurseries. Most of the
 commercial pine growing nurseries are located in Massachusetts, Connecticut, New York,
 New Jersey, and Pennsylvania. In the other Northwestern States there are only a few
 such nurseries producing white pines. Sanitation zones have been established around
 most of the important commercial nurseries in New England. Control work around the
 private nurseries in New York has been limited due to the relatively few white pines
 grown and the abundance of cultivated Ribes within the prescribed sanitation zones.
 which would necessitate a large expenditure by the nurserymen for compensation if
 these bushes were removed. According to the present state blight rust law in New
 York, effective February 17, 1930, no compensation shall be paid by the state for any
 removal of Ribes destroyed in connection with the establishment of Ribes-free zones
 around commercial nurseries, but fair compensation must be paid for such bushes by the
 person owning or operating the protected nursery. None of the commercial nurseries
 growing white pine in New Jersey and Pennsylvania have established sanitation zones,
 and action is now being taken to extend protection to the most important of these
 nurseries. A survey is being made of the Pennsylvania nurseries to determine the
 amount of white pine being grown and the need for control work.

Table 2 - Status of Nursery Sanitation Work - December 1932

State	No. Nurseries Growing White Pine		No. Nurseries Protected from Ribes	
	Stock Only	Total	Stock Only	Reforestation Grounds
Ala.	2	2	2	1
Ark.	1	2	1	2
Cal.	1	2	1	-
Conn.	0	4	0	11
Del.	-	-	-	2
Fla.	1	1	1	1
Georgia	1	1	1	1
Idaho	1	1	1	1
Ill.	18	18	18	24
Ind.	1	1	1	-
Iowa	1	1	1	-
Kent.	1	1	1	1
La.	1	1	1	1
Mass.	18	18	18	24
Mich.	1	1	1	1
Minnesota	1	1	1	1
Mont.	1	1	1	1
Neb.	1	1	1	1
N.J.	1	1	1	1
N.Y.	1	1	1	1
Pa.	1	1	1	1
R.I.	1	1	1	1
S.D.	1	1	1	1
Tenn.	1	1	1	1
Tex.	1	1	1	1
Va.	1	1	1	1
Wash.	1	1	1	1
W. Va.	1	1	1	1
Wis.	1	1	1	1
Wyo.	1	1	1	1
Total	49	49	49	49

(a) The two unprotected private nurseries growing white pine for both reforestation and ornamental purposes are no longer of importance from a control viewpoint. The one at Skowhegan, Me. is going out of business and the planting stock is too large for reforestation; while the other, located at Cupsuptic and owned by the Brown Company, is discontinuing the growing of white pine. The existing stock in this latter nursery will be planted locally on lands owned by the company.

(b) Three additional nurseries established sanitation zones, but abandoned them.

(c) One additional nursery established a sanitation zone, but abandoned it.

The number of private nurseries in Connecticut includes only those having 500 or more white pines; while in Massachusetts, only the larger commercial white pine growing nurseries are listed. In the other states, the number includes all nurseries growing white pines regardless of the amount of such stock. In Rhode Island there are only 3 private nurseries with more than 500 white pines; 6 of the other nurseries in this state and the two in Vermont each contain less than 100 white pines. Only 28 private nurseries in New Jersey have over 500 such trees. The 263 private pine growing nurseries in New York contained 364,544 white pines in 1932. Of this total number of trees, 207,700 were located in three nurseries (Hicks, Von Kleef, and United Forestry Company). Only 58 of the private nurseries in this state were growing 500 or more white pines and only 10 had 5,000 or more of this species.

(a) The two unprotected private nurseries growing white pine for both restoration and ornamental purposes are no longer of importance from a control viewpoint. The one at Greenham, Me. is going out of business and the planting stock is too large for restoration; while the other, located at Orono, Me. and owned by the Brown Company, is discontinuing the growing of white pine. The existing stock in this latter nursery will be planted locally on lands owned by the company.

(b) Three additional nurseries established sanitation zones, but abandoned them.

(c) One additional nursery established a sanitation zone, but abandoned it.

The number of private nurseries in Connecticut includes only those having 500 or more white pines; while in Massachusetts only the larger commercial white pine grow- ing nurseries are listed. In the other states, the number includes all nurseries grow- ing white pine regardless of the amount of each stock. In Rhode Island there are only 3 private nurseries with more than 500 white pines; 6 of the other nurseries in this state and the two in Vermont each contain less than 100 white pines. Only 28 private nurseries in New Jersey have over 500 each trees. The 263 private pine growing nurser- ies in New York contained 364,744 white pines in 1932. Of this total number of trees, 207,100 were located in three nurseries (Hick, Van Klee, and United Forestry Company). Only 25 of the private nurseries in this state were growing 500 or more white pines and only 10 had 5,000 or more of this species.

Table 27. - Summary of Special Nursery Sanitation Work in Northeastern States - 1932

State	Type of Erad.	No. Nurseries Work	Acreage Examined	Ribes Pulled		Cost					Per Acre	
				Wild	Cult.	Indiv.	Towns	State	Govt.	Total	Cost	Ribes
Me.	Initial	-	-	-	-	-	-	-	-	-	-	-
	Re-Erad.	1	30	211	-	-	7.73	3.87	-	11.60	.387	7.0
	Total	1	30	211	-	-	7.73	3.87	-	11.60	.387	7.0
N.H.	Initial	-	-	-	-	-	-	-	-	-	-	-
	Re-Erad.	1	165	804	-	28.51	-	7.13	-	35.64	.713	4.9
	Total	1	165	804	-	28.51	-	7.13	-	35.64	.713	4.9
Vt.	Initial	-	-	-	-	-	-	-	-	-	-	-
	Re-Erad.	1	200	1,450	-	-	-	187.03	-	187.03	.935	7.3
	Total	1	200	1,450	-	-	-	187.03	-	187.03	.935	7.3
Mass.	Initial	1	200	1,319	-	50.65	-	24.00	10.00	84.65	.423	6.6
	Re-Erad.	3	500	12	-	-	-	388.42	-	388.42	.777	0.02
	Total	4	700	1,331	-	50.65	-	412.42	10.00	473.07	.676	1.9
R.I.	Initial	6	1,190	133	520	-	-	343.56	162.87	506.43	.426	0.1
	Re-Erad.	-	-	-	-	-	-	-	-	-	-	-
	Total	6	1,190	133	520	-	-	343.56	162.87	506.43	.426	0.1
Conn.	Initial	-	-	-	-	-	-	-	-	-	-	-
	Re-Erad.	11	3,445	978	38	100.00	-	504.67	5.33	610.00	.177	0.28
	Total	11	3,445	978	38	100.00	-	504.67	5.33	610.00	.177	0.28
N.Y.	Initial	2	2,760	12,509	601	-	-	1117.76	-	1117.76	.405	4.5
	Re-Erad.	6	8,157	6,473	22	27.00	-	2592.58	-	2619.58	.321	0.79
	Total	8	10,917	18,982	623	27.00	-	3710.34	-	3737.34	.342	1.7
N.E. & N.Y.	Initial	9	4,150	13,961	1,121	50.65	-	1485.32	172.87	1708.84	.412	3.4
	Re-Erad.	23	12,497	9,928	60	155.51	7.73	3683.70	5.33	3852.27	.308	0.79
	Total	32	16,647	23,889	1,181	206.16	7.73	5169.02	178.20	5561.11	.336	1.4
N.J.	Initial	1	1,000	462	49	-	-	22.20	-	22.20	.022	0.46
	Re-Erad.	-	-	-	-	-	-	-	-	-	-	-
	Total	1	1,000	462	49	-	-	22.20	-	22.20	.022	0.46
Pa.	Initial	1	9	2,055	52	-	-	80.80	-	80.80	8.98	228.3
	Re-Erad.	2	406	2,615	-	-	-	144.45	-	144.45	.356	6.4
	Total	3	415	4,670	52	-	-	225.25	-	225.25	.543	11.3
All States	Initial	11	5,159	16,478	1,222	50.65	-	1588.32	172.87	1811.84	.351	3.2
	Re-Erad.	25	12,903	12,543	60	155.51	7.73	3828.15	5.33	3996.72	.313	0.97
	Total	36	18,062	29,021	1,282	206.16	7.73	5416.47	178.20	5808.56	.324	1.6

Table 28. - Summary of Special Nursery Sanitation Work in Northeastern States,
1930 - 1932, Inclusive.

(By States)

State	Type of Erad.	Acreage Examined	Ribes Pulled		Cost					Per Acre	
			Wild	Cult.	Indiv.	Towns	State	Govt.	Total	Cost	Ribes
Me.	Initial	206	103,516	22	324.45	-	198.20	-	522.65	2.54	502.5
	Re-Erad.	30	211	-	-	7.73	3.87	-	11.60	.387	7.0
	Total	236	103,727	22	324.45	7.73	202.07	-	534.25	2.26	439.5
N.H.	Initial	-	-	-	-	-	-	-	-	-	-
	Re-Erad.	646	7,345	-	153.08	-	48.36	-	201.44	.312	11.4
	Total	646	7,345	-	153.08	-	48.36	-	201.44	.312	11.4
Vt.	Initial	-	-	-	-	-	-	-	-	-	-
	Re-Erad.	450	1,540	-	-	-	303.54	-	303.54	.675	3.4
	Total	450	1,540	-	-	-	303.54	-	303.54	.675	3.4
Mass.	Initial	247	1,396	80	50.65	-	81.54	10.00	142.19	.576	5.7
	Re-Erad.	1,812	236	49	-	-	1,399.10	-	1,399.10	.772	0.13
	Total	2,059	1,632	129	50.65	-	1,480.64	10.00	1,541.29	.749	0.8
R.I.	Initial	1,190	133	520	-	-	343.56	162.87	506.43	.426	0.1
	Re-Erad.	-	-	-	-	-	-	-	-	-	-
	Total	1,190	133	520	-	-	343.56	162.87	506.43	.426	0.1
Conn.	Initial	6,587	5,352	102	204.32	-	345.69	139.92	689.93	.105	0.82
	Re-Erad.	29,513	3,802	834	557.04	-	1,549.33	377.83	2,484.20	.084	0.13
	Total	36,100	9,154	936	761.36	-	1,895.02	517.75	3,174.13	.088	0.25
N.Y.	Initial	3,055	13,137	634	5.60	-	1,154.25	-	1,159.85	.380	4.3
	Re-Erad.	26,819	71,950	906	131.97	-	8,950.59	-	9,082.56	.339	2.7
	Total	29,874	85,087	1,540	137.57	-	10,104.84	-	10,242.41	.343	2.8
N.E. & N.Y.	Initial	11,285	123,534	1,358	585.02	-	2,123.24	312.79	3,021.05	.268	10.9
	Re-Erad.	59,270	85,084	1,789	842.09	7.73	12,254.79	377.83	13,482.44	.227	1.4
	Total	70,555	208,618	3,147	1,427.11	7.73	14,378.03	690.62	16,503.49	.234	3.0
N.J.	Initial	1,000	462	49	-	-	22.20	-	22.20	.022	.046
	Re-Erad.	-	-	-	-	-	-	-	-	-	-
	Total	1,000	462	49	-	-	22.20	-	22.20	.022	.046
Pa.	Initial	895	9,303	52	-	-	588.43	-	588.43	.657	10.4
	Re-Erad.	1,161	13,127	-	-	-	635.11	-	635.11	.547	11.3
	Total	2,056	22,430	52	-	-	1,223.54	-	1,223.54	.595	10.9
All States	Initial	13,180	133,299	1,459	585.02	-	2,733.87	312.79	3,631.68	.276	10.1
	Re-Erad.	60,431	98,211	1,789	842.09	7.73	12,889.90	377.83	14,117.55	.234	1.6
	Total	73,611	231,510	3,248	1,427.11	7.73	15,623.77	690.62	17,749.23	.241	3.1

Table 28. - Summary of Special License Revenue for 1940-1941, by State

(By State)

State	Total	Private	Public	Govt.	Total	Private	Public	Govt.
Alabama	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Alaska	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Arizona	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Arkansas	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
California	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Colorado	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Connecticut	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Delaware	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
District of Columbia	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Florida	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Georgia	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Hawaii	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Idaho	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Illinois	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Indiana	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Iowa	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Kansas	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Kentucky	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Louisiana	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Maine	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Maryland	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Massachusetts	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Michigan	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Minnesota	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Mississippi	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Missouri	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Montana	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Nebraska	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Nevada	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
New Hampshire	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
New Jersey	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
New Mexico	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
New York	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
North Carolina	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
North Dakota	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Ohio	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Oklahoma	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Oregon	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Pennsylvania	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Rhode Island	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
South Carolina	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
South Dakota	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Tennessee	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Texas	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Utah	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Vermont	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Virginia	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Washington	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
West Virginia	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Wisconsin	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Wyoming	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-
Total	1,000.00	1,000.00	-	-	1,000.00	1,000.00	-	-

Table 29. - Summary of Special Nursery Sanitation Work in Northeastern States,
1930 - 1932 (Inclusive)

(By Years)

Year	Type of Erad.	Acreage Examined	Ribes Pulled		Cost					Per Acre	
			Wild	Cult.	Indiv.	Towns	State	Govt.	Total	Cost	Ribes
1930	Initial	4,973	110,704	182	528.77	-	905.19	-	1,433.96	.288	22.3
	Re-Erad.	20,752	59,542	643	568.89	-	4,198.33	-	4,767.22	.230	2.9
	Total	25,725	170,246	825	1,097.66	-	5,103.52	-	6,201.18	.241	6.6
1931	Initial	3,048	6,117	55	5.60	-	240.36	139.92	385.88	.127	2.0
	Re-Erad.	26,776	26,126	1,086	117.69	-	4,863.42	372.50	5,353.61	.200	1.0
	Total	29,824	32,243	1,141	123.29	-	5,103.78	512.42	5,739.49	.192	1.1
1932	Initial	5,159	16,478	1,222	50.65	-	1,588.32	172.87	1,811.84	.351	3.2
	Re-Erad.	12,903	12,543	60	155.51	7.73	3,828.15	5.33	3,996.72	.313	0.97
	Total	18,062	29,021	1,282	206.16	7.73	5,416.47	178.20	5,808.56	.324	1.6
Totals	Initial	13,180	133,299	1,459	585.02	-	2,733.87	312.79	3,631.68	.276	10.1
	Re-Erad.	60,431	98,211	1,789	842.09	7.73	12,889.90	377.83	14,117.55	.234	1.6
	Total	73,611	231,510	3,248	1,427.11	7.73	15,623.77	690.62	17,749.23	.241	3.1

Table 29. - Summary of Special Forestry Collection 1937, in North-western States
1930 - 1937 (inclusive)

(In Yards)

Year	Total	Forest				Other			
		State	County	Indian	Private	State	County	Indian	Private
1930	1,117.50	-	-	-	1,117.50	-	-	-	-
1931	1,117.50	-	-	-	1,117.50	-	-	-	-
1932	1,117.50	-	-	-	1,117.50	-	-	-	-
1933	1,117.50	-	-	-	1,117.50	-	-	-	-
1934	1,117.50	-	-	-	1,117.50	-	-	-	-
1935	1,117.50	-	-	-	1,117.50	-	-	-	-
1936	1,117.50	-	-	-	1,117.50	-	-	-	-
1937	1,117.50	-	-	-	1,117.50	-	-	-	-
Total	1,117.50	-	-	-	1,117.50	-	-	-	-

As previously mentioned, no separate record was kept of the nursery sanitation work prior to 1930. Such control work was included in the regular Ribes eradication summaries. However, an incomplete summary was secured from the state leaders (based on available data and including estimates in several instances) for the period 1925 - 1929.

Table 30. - Summary of Special Nursery Sanitation Work in Northeastern States 1925 - 1929.

State	Type of Erad.	Acreage Eradicated	Ribes Pulled		Cost					Per Acre	
			Wild	Cult.	Indiv.	Towns	State	Govt.	Total	Cost	Ribes
Me.	Initial	415	91,569	-	617.10	-	-	-	617.10	1.49	220.6
	Re-Erad.	400	1,343	-	74.20	10.80	-	-	85.00	.213	3.4
	Total	815	92,912	-	691.30	10.80	-	-	702.10	.861	114.0
N.H.	Initial	115	29	-	-	-	16.56	-	16.56	.144	0.3
	Re-Erad.	805	3,351	45	245.65	-	161.97	-	407.62	.506	4.2
	Total	920	3,380	45	245.65	-	178.53	-	424.18	.461	3.7
Vt.	Initial	-	-	-	-	-	-	-	-	-	-
	Re-Erad.	700	5	-	-	-	479.64	-	479.64	.685	.001
	Total	700	5	-	-	-	479.64	-	479.64	.685	.001
Mass.	Initial	10,825	5,641	4,488	-	-	7,759.85	-	7,759.85	.717	0.5
	Re-Erad.	4,625	21	648	-	-	918.90	-	918.90	.199	.004
	Total	15,450	5,662	5,136	-	-	8,678.75	-	8,678.75	.562	0.4
Conn.	Initial	5,342	159	1,836	242.75	-	769.71	-	1,012.46	.190	.03
	Re-Erad.	5,580	1,083	1,431	72.00	-	547.90	75.00	694.90	.125	0.2
	Total	10,922	1,242	3,267	314.75	-	1,317.61	75.00	1,707.36	.156	0.1
N.Y.	Initial	8,762	41,795	-	-	-	1,939.94	-	1,939.94	.221	4.8
	Re-Erad.	9,020	97,047	294	-	-	4,795.28	-	4,795.28	.532	10.8
	Total	17,782	138,842	294	-	-	6,735.22	-	6,735.22	.379	7.8
Totals	Initial	25,459	139,193	6,324	859.85	-	10,486.06	-	11,345.91	.446	5.5
	Re-Erad.	21,130	102,850	2,418	391.85	10.80	6,903.69	75.00	7,381.34	.349	4.9
	Total	46,589	242,043	8,742	1,251.70	10.80	17,389.75	75.00	18,727.25	.402	5.2

No nursery sanitation work performed in Northeastern States not listed above.

As previously mentioned, no separate record was kept of the money expended for the purpose of 1970. Such material was included in the regular financial statement. However, an estimate of the amount was derived from the data listed below. An available date and location is indicated in several instances for the period 1970-1971.

Table 30 - Summary of Special Survey Activities for 1970-1971

Type of Survey	Date	Total		State		Federal		Total	
		Amount	Personnel	Amount	Personnel	Amount	Personnel	Amount	Personnel
Initial	1970	10.00	1	10.00	1	10.00	1	10.00	1
Re-survey	1970	10.00	1	10.00	1	10.00	1	10.00	1
Total	1970	20.00	2	20.00	2	20.00	2	20.00	2
Initial	1971	10.00	1	10.00	1	10.00	1	10.00	1
Re-survey	1971	10.00	1	10.00	1	10.00	1	10.00	1
Total	1971	20.00	2	20.00	2	20.00	2	20.00	2
Initial	1972	10.00	1	10.00	1	10.00	1	10.00	1
Re-survey	1972	10.00	1	10.00	1	10.00	1	10.00	1
Total	1972	20.00	2	20.00	2	20.00	2	20.00	2
Initial	1973	10.00	1	10.00	1	10.00	1	10.00	1
Re-survey	1973	10.00	1	10.00	1	10.00	1	10.00	1
Total	1973	20.00	2	20.00	2	20.00	2	20.00	2
Initial	1974	10.00	1	10.00	1	10.00	1	10.00	1
Re-survey	1974	10.00	1	10.00	1	10.00	1	10.00	1
Total	1974	20.00	2	20.00	2	20.00	2	20.00	2
Initial	1975	10.00	1	10.00	1	10.00	1	10.00	1
Re-survey	1975	10.00	1	10.00	1	10.00	1	10.00	1
Total	1975	20.00	2	20.00	2	20.00	2	20.00	2
Initial	1976	10.00	1	10.00	1	10.00	1	10.00	1
Re-survey	1976	10.00	1	10.00	1	10.00	1	10.00	1
Total	1976	20.00	2	20.00	2	20.00	2	20.00	2
Initial	1977	10.00	1	10.00	1	10.00	1	10.00	1
Re-survey	1977	10.00	1	10.00	1	10.00	1	10.00	1
Total	1977	20.00	2	20.00	2	20.00	2	20.00	2
Initial	1978	10.00	1	10.00	1	10.00	1	10.00	1
Re-survey	1978	10.00	1	10.00	1	10.00	1	10.00	1
Total	1978	20.00	2	20.00	2	20.00	2	20.00	2
Initial	1979	10.00	1	10.00	1	10.00	1	10.00	1
Re-survey	1979	10.00	1	10.00	1	10.00	1	10.00	1
Total	1979	20.00	2	20.00	2	20.00	2	20.00	2
Initial	1980	10.00	1	10.00	1	10.00	1	10.00	1
Re-survey	1980	10.00	1	10.00	1	10.00	1	10.00	1
Total	1980	20.00	2	20.00	2	20.00	2	20.00	2

No money expended for the purpose of 1970-1971.

Table 31. - Summary of Special Nursery Sanitation Work in Northeastern States,
1925 - 1932

State	Type of Erad.	Acreage Eradicated	Ribes Pulled		Cost					Per Acre	
			Wild	Cult.	Indiv.	Towns	State	Govt.	Total	Cost	Ribes
Me.	Initial	621	195,085	22	941.55	-	198.20	-	1,139.75	1.84	314.1
	Re-Erad.	430	1,554	-	74.20	18.53	3.87	-	96.60	.225	3.6
	Total	1,051	196,639	22	1,015.75	18.53	202.07	-	1,236.35	1.18	187.1
N.H.	Initial	115	29	-	-	-	16.56	-	16.56	.144	0.3
	Re-Erad.	1,451	10,696	45	398.73	-	210.33	-	609.06	.420	7.4
	Total	1,566	10,725	45	398.73	-	226.89	-	625.62	.400	6.8
Vt.	Initial	-	-	-	-	-	-	-	-	-	-
	Re-Erad.	1,150	1,545	-	-	-	783.18	-	783.18	.681	1.3
	Total	1,150	1,545	-	-	-	783.18	-	783.18	.681	1.3
Mass.	Initial	11,072	7,037	4,568	50.65	-	7,841.39	10.00	7,902.04	.714	0.6
	Re-Erad.	6,437	257	697	-	-	2,318.00	-	2,318.00	.360	0.03
	Total	17,509	7,294	5,265	50.65	-	10,159.39	10.00	10,220.04	.584	0.4
R.I.	Initial	1,190	133	520	-	-	343.56	162.87	506.43	.426	0.1
	Re-Erad.	-	-	-	-	-	-	-	-	-	-
	Total	1,190	133	520	-	-	343.56	162.87	506.43	.426	0.1
Conn.	Initial	11,929	5,511	1,938	447.07	-	1,115.40	139.92	1,702.39	.143	0.5
	Re-Erad.	35,093	4,885	2,265	629.04	-	2,097.23	452.83	3,179.10	.091	0.1
	Total	47,022	10,396	4,203	1,076.11	-	3,212.63	592.75	4,881.49	.104	0.2
N.Y.	Initial	11,817	54,932	634	5.60	-	3,094.19	-	3,099.79	.262	4.6
	Re-Erad.	35,839	168,997	1,200	131.97	-	13,745.87	-	13,877.84	.387	4.7
	Total	47,656	223,929	1,834	137.57	-	16,840.06	-	16,977.63	.356	4.7
N.E. & N.Y.	Initial	36,744	262,727	7,682	1,444.87	-	12,609.30	312.79	14,366.96	.391	7.2
	Re-Erad.	80,400	187,934	4,207	1,233.94	18.53	19,158.48	452.83	20,863.78	.259	2.3
	Total	117,144	450,661	11,889	2,678.81	18.53	31,767.78	765.62	35,230.74	.301	3.8
N.J.	Initial	1,000	462	49	-	-	22.20	-	22.20	.022	0.5
	Re-Erad.	-	-	-	-	-	-	-	-	-	-
	Total	1,000	462	49	-	-	22.20	-	22.20	.022	0.5
Pa.	Initial	895	9,303	52	-	-	588.43	-	588.43	.657	10.4
	Re-Erad.	1,161	13,127	-	-	-	635.11	-	635.11	.547	11.3
	Total	2,056	22,430	52	-	-	1,223.54	-	1,223.54	.595	10.9
Totals	Initial	38,639	272,492	7,783	1,444.87	-	13,219.93	312.79	14,977.59	.388	7.1
	Re-Erad.	81,561	201,061	4,207	1,233.94	18.53	19,793.59	452.83	21,498.89	.264	2.5
	Total	120,200	473,553	11,990	2,678.81	18.53	33,013.52	765.62	36,476.48	.303	3.9

Black Currant Eradication

The cooperating states are eliminating *Ribes nigrum* as rapidly as practicable. During the past few years, such work has been conducted as a special project in Massachusetts, Rhode Island, Connecticut and New York (all of these states, except Massachusetts, have definite state laws which prohibit the possession of *Ribes nigrum*). In the other Northeastern States, except New Jersey, the black currants are destroyed in conjunction with the regular *Ribes* eradication work. It will, however, be necessary in these states to make special arrangements for eliminating *Ribes nigrum* outside the control areas.

Table 32.- Status of Special Black Currant Eradication Projects - December, 1932.

State	Years Work Performed	Total No. Towns			
		Completed	Partially Completed	Total Worked	Total in State
Mass.	1930-1932, Incl.	286	24	310	355
R.I.	1929-1932, Incl.	38	1	39	39
Conn.	1930-1932, Incl.	12	-	12	168
N.Y.	1928-1932, Incl.	201	*	201	1,012
Totals	-	537	25	562	1,574

*Some work has been done in a few towns in conjunction with regular control work.

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Table 33. - Summary of Special Black Currant Eradication Work in Northeastern States - 1932

State	No. Towns		No. Patches	Ribes Pulled			Cost			
	Worked	Completed		Nigrum	Other Cult.	Total	Indiv.	Govt.	State	Total
Mass.	31	30	386	2,147	-	2,147	212.00	-	2,175.99	2,387.99
R.I.	5	4	226	1,747	-	1,747	-	201.86	982.49	1,184.35
Conn.	8	8	785	109	4,318	4,427	-	770.00	876.33	1,646.33
N.Y.	46	46	881	7,537	-	7,537	-	-	5,030.74	5,030.74
Totals	90	88	2,278	11,540	4,318	15,858	212.00	971.86	9,065.55	10,249.41

1928 - 1932

State	Ribes Pulled			Cost			
	Nigrum	Other Cult.	Total	Indiv.	Govt.	State	Total
Mass.	26,609*	-	26,609	1,630.25	100.00	16,623.79*	18,354.04
R.I.	15,676	1,093	16,769	-	675.53	8,852.44	9,527.97
Conn.	272	15,669	15,941	-	2,791.52	1,754.00	4,545.52
N.Y.	24,308	761	25,069	-	-	18,486.25	18,486.25
Totals	66,865	17,523	84,388	1,630.25	3,567.05	45,716.48	50,913.78

*Includes 556 bushes pulled in connection with special Ribes eradication work around nurseries in 1925 and 1926 at a cost of \$367.89 to the state.

Table 33. - Summary of Special Black Duck Banding Station in Louisiana
Station - 1932

State	Number of birds banded	Number of birds recovered	Number of birds recovered as a percentage of those banded	Number of birds recovered as a percentage of those banded	Number of birds recovered as a percentage of those banded	Number of birds recovered as a percentage of those banded	Number of birds recovered as a percentage of those banded	Number of birds recovered as a percentage of those banded	Number of birds recovered as a percentage of those banded
La.	17	17	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Miss.	4	4	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ark.	5	5	100.00	100.00	100.00	100.00	100.00	100.00	100.00
T.	16	16	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Grand Total	42	42	100.00	100.00	100.00	100.00	100.00	100.00	100.00

1932 - 1932

State	Number of birds banded	Number of birds recovered	Number of birds recovered as a percentage of those banded	Number of birds recovered as a percentage of those banded	Number of birds recovered as a percentage of those banded	Number of birds recovered as a percentage of those banded	Number of birds recovered as a percentage of those banded	Number of birds recovered as a percentage of those banded	Number of birds recovered as a percentage of those banded
La.	17	17	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Miss.	4	4	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Ark.	5	5	100.00	100.00	100.00	100.00	100.00	100.00	100.00
T.	16	16	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Grand Total	42	42	100.00	100.00	100.00	100.00	100.00	100.00	100.00

*Includes eggs banded in connection with special black duck banding station in 1932 and 1933 at a cost of \$167.00 to the State.

Table 34.- Personnel Employed on Cooperative Blister Rust Control Work in the Northeastern States During 1932

(Regardless of length of time employed)

State	Me.	N.H.	Vt.	Mass.	R.I.	Conn.	N.Y.	N.E. & N.Y.	N.J.	Pa.	All States
State leaders	1	1	-	1	-	1	1	5	-	1	6
Permanent B.R.C. Agents	4	7	1	5	1	-	11	29	1	2	32
Temporary B.R.C. Agents	8	-	3	(Foreman) 4	1	(Scouts) 3	-	19	-	3	22
State Checkers and Eradication Assistants	-	3	-	-	-	-	3	6	-	1	7
Foremen	24	12	4	20	-	2	102	164	-	26	190
Scouts	*	23	-	-	-	3	40	66	-	-	66
State laborers	144	101	8	-	4	11	217	485	4	133	622
Owners' laborers	26	-	251	1,385	-	10	1,275	2,947	-	174	3,121
Totals	207	147	267	1,415	6	30	1,649	3,721	5	340	4,066

*Included with "Temporary blister rust control agents".

A total of 945 state and Federal employees were engaged in cooperative blister rust control work in the Northeastern States during 1932. An additional 3,121 individuals (pine or Ribes owners or their employees) assisted in eradicating Ribes. Three foremen and 18 laborers were employed on the Federal control project at Acadia National Park, and six laborers were used on a similar project at Allegheny National Forest. Thus, 4,093 persons actually participated in the field work. Many owners also paid for work on their lands, but took no personal part in pulling the bushes and several hundred other persons permitted the destruction of their cultivated Ribes without compensation. Estimated conservatively, 4,500 people had more or less of an active part in the control work. The blister rust control agents also reported that 3,244 individuals gave general support to the work, making a total of 7,744 people who cooperated directly or indirectly in the control work.

*Betwixt Fortness & my wife's untroubled" nite's balm/and!

PERSONNEL OF DIVISION OF BLISTER RUST CONTROL IN THE NORTHEASTERN STATES

-49-

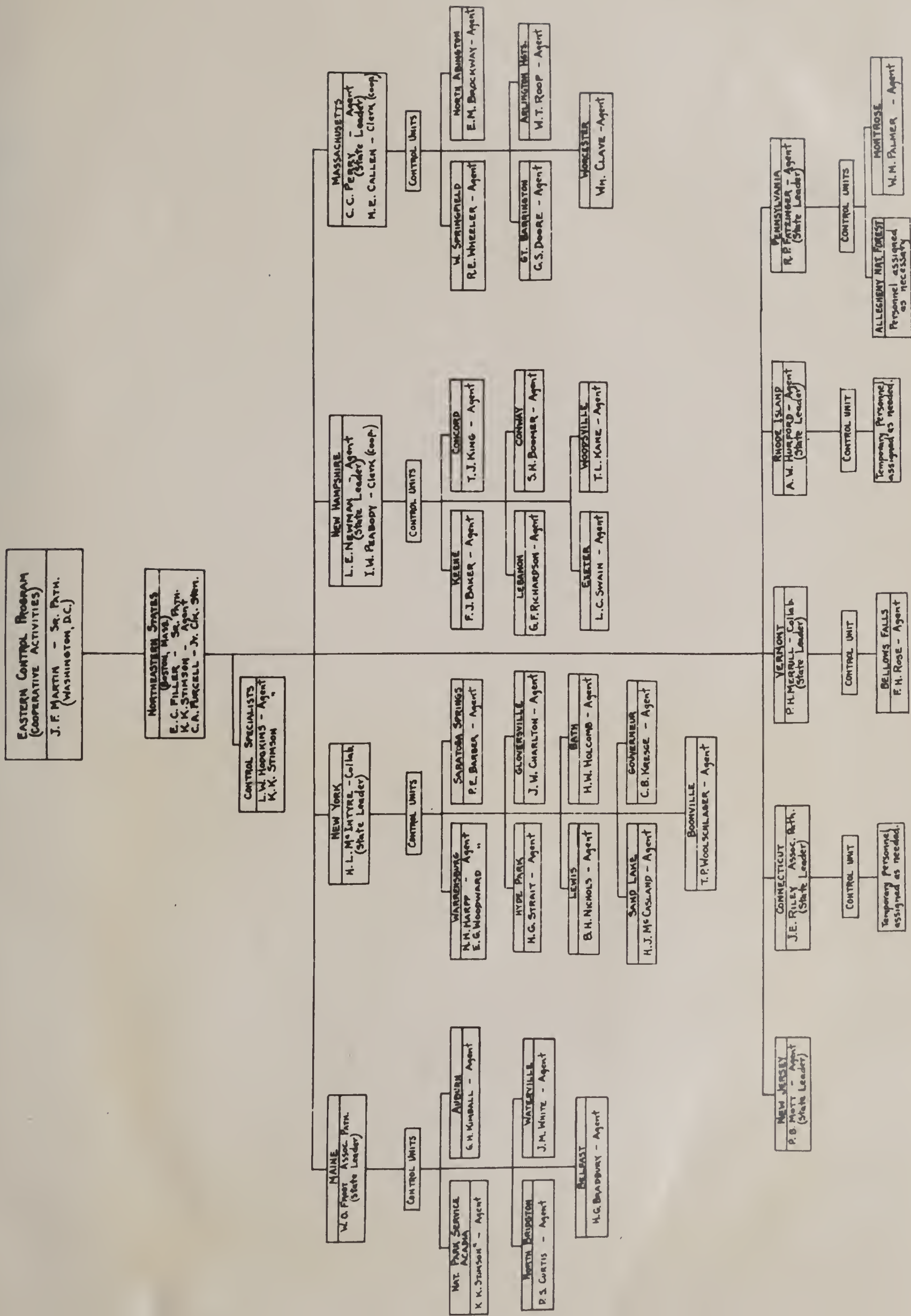
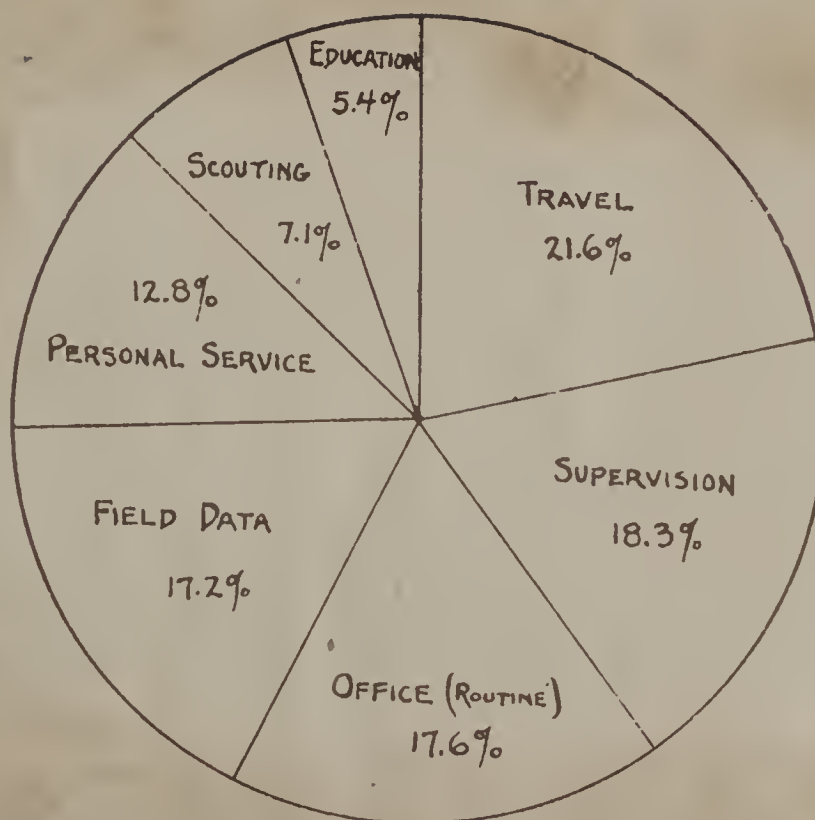


Table 35.- Per Cent of Time Spent on Each Activity by Average Permanent Agent in New England and New York - 1932

State	Education		Personal Service		Supervision		Field Data		Scouting	Office (Routine)	Travel
	Office	Field	Office	Field	Office	Field	Office	Field			
Me.	.4	2.6	.1	15.4	1.3	18.1	.4	2.0	6.1	27.3	26.3
N.H.	3.4	4.0	1.1	11.0	2.5	17.5	7.3	12.7	5.9	13.5	21.1
Vt.	.4	5.1	-	40.1	-	10.7	5.3	3.2	1.8	14.8	18.6
Mass.	2.0	4.7	1.3	10.7	2.7	16.7	3.0	3.1	7.4	27.5	20.9
R.I.	12.0	10.2	20.1	7.3	20.5	10.8	-	-	2.1	3.7	13.3
Conn.	No permanent agents employed										
N.Y.	1.2	1.7	.3	8.7	2.7	13.2	17.9	10.5	9.1	13.3	21.4
Totals	2.1	3.3	1.3	11.5	2.9	15.4	9.2	8.0	7.1	17.6	21.6

The average permanent agent worked 319.9 eight-hour working days during the year.

Portion of Time Spent on Each Activity by Average Permanent Agent in New England and New York During 1932



TOTAL TIME WORKED BY AVERAGE AGENT - 2559.0 HOURS

Table 12 - Portion of Time Spent on Each Activity by Average Permanent Agent in New York and New York - 1932

Travel	Office (Routine)	Scouting	Investigation		Education		Personal Service		Investigation		Education	
			Office Field	Field Data	Office Field	Field Data	Office Field	Field Data	Office Field	Field Data	Office Field	Field Data
22.3	27.3	6.1	2.0	4	12.1	1.3	12.4	1	2.6	4	2.6	4
21.1	13.2	2.2	12.7	7.3	17.2	2.2	11.0	1.1	4.0	3.4	4.0	3.4
18.6	14.8	1.8	3.2	2.3	10.7	-	40.1	-	2.1	4	2.1	4
20.9	27.2	7.4	3.1	3.0	12.7	2.7	10.7	1.2	4.7	2.0	4.7	2.0
13.3	3.7	2.1	-	-	10.3	20.2	7.3	20.1	10.2	12.0	10.2	12.0
To permanent agents employed												
21.4	13.3	9.1	10.2	17.9	13.2	2.7	8.7	3	1.7	1.2	1.7	1.2
21.6	17.6	7.1	2.0	2.2	12.4	2.9	11.2	1.3	2.3	2.1	2.3	2.1

The average permanent agent worked 31.9 eight-hour working days during the

Portion of Time Spent on Each Activity by Average Permanent Agent in New England and New York During 1932



Table 36.- Summary of State Compensation Paid for Cultivated Ribes Destroyed in Northeastern States

State	Period	Total Number Cultivated Ribes Destroyed	No. Bushes for Which Compensation Was Actually Paid	No. Persons Paid Compensation	Amount Paid in Reimbursement
Me.	1932	4,726	0	0	0
	1922-1932	117,511	0	0	0
	1918-1932	119,112	0	0	0
N.H.	1932	1,145	182	3	8.68
	1922-1932	82,458	752	26	138.15
	1918-1932	143,975	2,008	63	550.60
Vt.	1932	4,757	0	0	0
	1922-1932	10,642	1,522	121	738.66
	1918-1932	10,924	1,577	127	762.66
Mass.	1932	5,218	558	10	188.00
	1922-1932	259,654	22,931	381	8,217.20
	1918-1932	269,999	40,103	637	14,173.50
R.I.	1932	2,556	0	0	0
	1922-1932	25,394	94	7	35.85
	1918-1932	29,645	1,410	58	509.79
Conn.	1932	5,681	0	0	0
	1922-1932	40,223	175	16	103.50
	1918-1932	40,231	175	16	103.50
N.Y.	1932	14,698	598	51	292.45
	1922-1932	67,936	4,499	716	1,845.41
	1918-1932	81,679	14,744	1,023	4,918.99
N.E. & N.Y.	1932	38,781	1,338	64	489.13
	1922-1932	603,818	29,973	1,267	11,078.77
	1918-1932	695,565	60,017	1,924	21,019.04
N.J.	1932	49	0	0	0
	1922-1932	49	0	0	0
	1918-1932	49	0	0	0
Pa.	1932	3,401	0	0	0
	1922-1932	5,528	0	0	0
	1918-1932	5,528	0	0	0
All States	1932	42,231	1,338	64	489.13
	1922-1932	609,395	29,973	1,267	11,078.77
	1918-1932	701,142	60,017	1,924	\$21,019.04

The Vermont data include \$82.00 compensation paid by individual cooperators in 1926 to 9 owners of cultivated Ribes for the removal of 164 bushes.

The Massachusetts data include \$5,655.05 paid in 1918 to 253 persons for 16,517 bushes destroyed in 1917 and 1918, mostly in 1917. It is impossible to separate the 1917 data.

The Connecticut data include \$76.25 paid in 1930 by individual cooperators (nurserymen) to 12 owners of cultivated Ribes for the removal of 114 bushes.

Treatment of Infected White Pines in Northeastern States - 1932

In Maine 14 individuals expended a total of \$977.12 in the treatment of infected white pines in eleven towns in six counties. A total of 80,000 white pines were examined; 47,000 trees were pruned, including 479 large ornamental pines. Fourteen thousand branch infections and 1,310 trunk cankers were removed, and nearly 6,000 dead or doomed ornamental and plantation pines cut down.

Similar work was carried on in connection with the Federal control project at Acadia National Park. The National Park Service purchased tools for this work and expended \$321.04 for labor on this project. Detailed records were kept concerning the treatment accorded each tree and the data are summarized in Table .

Table 37.- Treatment of Pines for Blister Rust Infection - Acadia National Park, 1932

Tree Height Class (In feet)	Total No. Pines Treated	No. Stem Cankered Trees Cut Down	No. Infected Branches Removed	No. Dead or Dying Tops Removed	No. Cankers Cut Out
1-10	306	235	68	5	8
11-20	72	52	30	3	4
21-40	68	20	144	8	11
Over 40	269	12	1,167	55	38
Total	715	319	1,409	71	61

In addition, the Federal crew at Acadia National Park did similar work on the property of the Cancer Research Laboratory and at the Mt. Desert Nursery. The cost of this work amounting to \$67.20 was paid by Mr. Dorr, Superintendent of Acadia National Park. A total of 204 pines were treated, 98 trees with trunk cankers were cut down, 404 infected branches and 17 tops were removed, and 15 cankers cut out. This work is included in the summary for the state given in the first paragraph.

At Pok-O-Moonshine Camp in New York, the infected pines on seven acres were treated. A total of 981 branch cankers and 16 tops were removed. In addition, 51 infected pines were cut down, 37 of these trees being over 6 inches in diameter at breast height.

TOTAL STATE AND FEDERAL EXPENDITURES ON ALL
COOPERATIVE BLISTER RUST CONTROL WORK
IN NORTHEASTERN STATES

	FEDERAL	STATE	TOTAL
TOTAL STATE AND FEDERAL EXPENDITURES ON ALL COOPERATIVE BLISTER RUST CONTROL WORK IN NORTHEASTERN STATES	\$10,000.00	\$10,000.00	\$20,000.00

TOTAL STAGE AND UNDERSTANDING ON ALL

COOPERATIVE BILLYE MUST COME FROM

IN NORTHWESTERN STATES

State and Federal Cooperative Blister Rust Control Funds Used for All
Projects in Northeastern States During Calendar Year 1932

Table 38.- Source of Total State Funds Expended in Various
Northeastern States During Calendar Year 1932

Source of Funds	State Blister Rust Appropriations	Nursery Funds	Town Funds	Individual Funds or Labor	County Funds	All Other Coop. State Funds	Total State Funds
Me.	\$ 6,650.50	\$ 500.00	\$8,245.27	\$3,343.22	-	-	\$ 18,738.99
N.H.	15,129.67	-	9,167.99	317.11	-	-	24,614.77
Vt.	1,371.05	-	529.70	2,689.72	-	-	4,590.47
Mass.	11,823.18	818.68	-	6,173.42	-	444.90	19,260.18
R.I.	3,318.21	-	-	-	-	-	3,318.21
Conn.	7,228.21	-	1,633.00	292.00	-	36.00	9,189.21
N.Y.	65,381.49	-	-	6,078.54	1,252.88	5,996.10	78,709.01
N.E. & N.Y.	110,902.31	1,318.68	19,575.96	18,894.01	1,252.88	6,477.00	158,420.84
N.J.	1,494.06	-	-	-	-	22.20	1,516.26
Pa.	11,591.46	-	-	615.17	-	71.20	12,277.83
All States	\$123,987.83	\$1,318.68	\$19,575.96	\$19,509.18	\$1,252.88	\$6,570.40	\$172,214.93

Percentage of Total State Funds in Respective States
Derived From Various Sources

Source of Funds	State Blister Rust Appropriations	Nursery Funds	Town Funds	Individual Funds or Labor	County Funds	All Other Coop. State Funds	Total State Funds
Me.	35.5	2.7	44.0	17.8	-	-	100.0
N.H.	61.5	-	37.2	1.3	-	-	100.0
Vt.	29.9	-	11.5	58.6	-	-	100.0
Mass.	61.4	4.2	-	32.1	-	2.3	100.0
R.I.	100.0	-	-	-	-	-	100.0
Conn.	78.6	-	17.8	3.2	-	0.4	100.0
N.Y.	83.1	-	-	7.7	1.6	7.7	100.0
N.E. & N.Y.	70.0	0.8	12.4	11.9	0.8	4.1	100.0
N.J.	98.5	-	-	-	-	1.5	100.0
Pa.	94.4	-	-	5.0	-	0.6	100.0
All States	72.0	0.8	11.4	11.3	0.7	3.8	100.0

State and Federal Cooperative Winter Fuel Control Funds Used for All Projects in Northeastern States During Calendar Year 1942

Table 22 - Source of Total State Funds Expended in Various Northeastern States During Calendar Year 1942

State	State Appropriations	State First	Nursery Funds	Town Funds	Individual Funds or Labor	County Funds	All Other Coop. State Funds	Total State Funds
Ala.	11,521.46	-	-	-	612.17	-	11.20	12,133.63
Ariz.	1,444.06	-	-	-	-	-	22.20	1,466.26
Cal.	110,905.31	1,718.58	13,217.96	18,844.01	1,322.48	6,477.00	-	130,402.64
Col.	62,381.49	-	-	-	6,078.24	1,322.88	2,222.10	70,004.71
Conn.	7,228.21	-	1,633.00	225.00	-	-	36.00	9,122.21
Del.	7,718.21	-	-	-	-	-	-	7,718.21
Fla.	11,327.18	618.68	-	-	6,173.45	-	444.90	18,580.18
Ill.	1,271.02	-	222.70	-	2,689.72	-	-	4,183.44
Ind.	12,122.67	-	2,167.99	217.11	-	-	-	14,507.77
Iowa	2,650.50	\$ 200.00	\$8,242.21	\$3,342.22	-	-	-	\$14,235.93

Percentage of Total State Funds in Various Sources Derived from Various Sources

State	State Appropriations	State First	Nursery Funds	Town Funds	Individual Funds or Labor	County Funds	All Other Coop. State Funds	Total State Funds
Ala.	72.0	0.3	11.4	11.2	0.7	-	3.8	100.0
Ariz.	94.4	-	-	-	4.0	-	0.6	100.0
Cal.	92.7	-	-	-	-	-	1.4	100.0
Col.	70.0	0.8	12.4	11.9	4.1	0.8	4.1	100.0
Conn.	83.1	-	-	-	7.7	1.6	7.7	100.0
Del.	72.6	-	-	17.8	3.2	-	0.4	100.0
Fla.	100.0	-	-	-	-	-	-	100.0
Ill.	61.4	4.2	-	-	29.1	-	2.3	100.0
Ind.	29.9	-	11.2	28.0	1.2	-	-	100.0
Iowa	61.5	-	27.2	1.2	-	-	-	100.0
Iowa	32.2	2.7	44.0	17.8	-	-	-	100.0

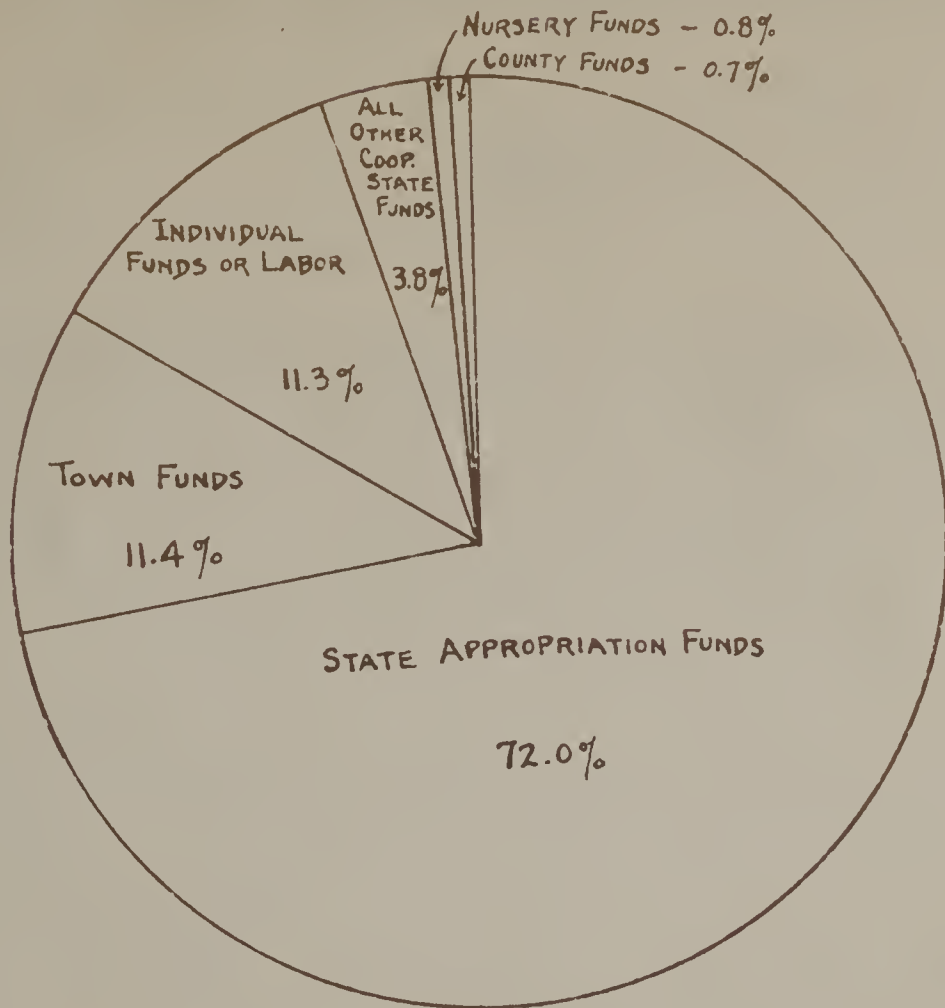
Table 39.- Total State and Federal Expenditures in Northeastern States
During Calendar Year 1932

State	Total State Expenditures	Total Federal \$ For \$ Expenditures	Total State and Federal Expenditures	% Total State and Federal Expenditures Derived from Federal \$ For \$ Funds
Me.	18,738.99	17,524.43	36,263.42	48.3
N.H.	24,614.77	22,315.39	46,930.16	47.6
Vt.	4,590.47	4,242.99	8,833.46	48.0
Mass.	19,260.18	17,378.96	36,639.14	47.4
R.I.	3,318.21	2,913.93	6,232.14	46.8
Conn.	9,189.21	6,865.06	16,054.27	42.8
N.Y.	78,709.01	26,640.56	105,349.57	25.3
N.E. & N.Y.	158,420.84	97,881.32	256,302.16	38.2
N.J.	1,516.26	1,150.46	2,666.72	43.1
Pa.	12,277.83	7,637.99	19,915.82	38.4
All States	172,214.93	106,669.77	278,884.70	38.2

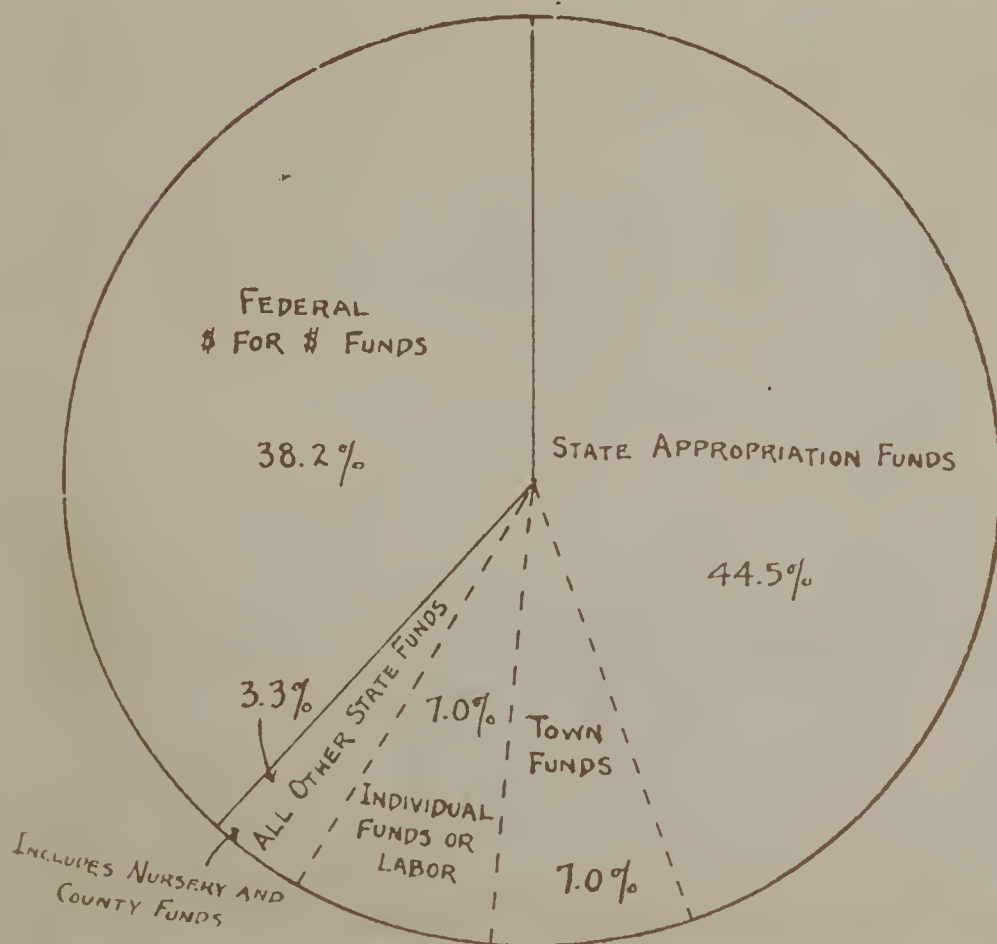
Table 1. Total and Average Values of Various Parameters in the Study Area
 (Values are in mg/L)

Parameter	Location 1	Location 2	Location 3	Location 4	Location 5
1. pH	7.2	7.5	7.8	8.1	8.4
2. DO	2.1	2.3	2.5	2.7	2.9
3. BOD	1.5	1.8	2.1	2.4	2.7
4. COD	3.2	3.5	3.8	4.1	4.4
5. TSS	4.5	4.8	5.1	5.4	5.7
6. Nitrate	1.2	1.5	1.8	2.1	2.4
7. Ammonia	0.8	0.9	1.0	1.1	1.2
8. Chlorophyll a	0.5	0.6	0.7	0.8	0.9
9. Dissolved Oxygen	1.8	2.0	2.2	2.4	2.6
10. Water Temperature	22.5	23.0	23.5	24.0	24.5

PROPORTION OF TOTAL BLISTER RUST CONTROL EXPENDITURES IN NORTHEASTERN STATES DURING CALENDAR YEAR 1932 PAID BY VARIOUS COOPERATING AGENCIES



TOTAL STATE EXPENDITURES - \$172,214.93



TOTAL STATE AND FEDERAL EXPENDITURES - \$278,884.70

EXPLANATION OF STATE AND FEDERAL EXPENDITURES FOR VARIOUS BLISTER RUST CONTROL PROJECTS IN NORTHEASTERN STATES DURING THE CALENDAR YEAR 1932

(Basis for project costs)

Supervision

State Expenditures

Maine and Massachusetts: Expenses for state leaders.

New Hampshire: Upkeep and maintenance of state car (except gas and oil) for state leader - state salary for permanent clerk and wages for any temporary assistants on blister rust control work at Concord office.

Vermont: Salary (\$50.00 per month) and expenses of Assistant State Forester Lockard for time spent on blister rust control work.

Connecticut: Expenses of Filley while on blister rust work, including cost of new automobile - arbitrary part of salary for a permanent clerk at New Haven office (\$55.00 per month) - salary of temporary agent who assisted for two months at office.

Rhode Island: One fourth of expenses paid by state to leader - arbitrary charge of \$25.00 per month for clerical assistance at Providence office.

New York: State Leader McIntyre's salary and expenses are not charged against blister rust activities.

New Jersey: One fourth of state leader's salary and expenses during entire year, except April and May.

Pennsylvania: Charge of \$100 per month from July to December for assistance at Harrisburg office, state leader's expenses and salary, and expenses of agent May during January.

Federal Expenditures

Maine and Massachusetts: Yearly salaries of state leaders - also in Massachusetts \$20.00 per month for clerical assistance at state office.

New Hampshire: Salary and expenses of state leader - \$45.00 per month for clerical assistance at state office.

New York: Expenses of Mr. McIntyre during month of March.

Rhode Island, Connecticut, New Jersey and Pennsylvania: One-fourth of the salaries and expenses of the state leaders.

B. R. C. Agent Activities

State Expenditures

All States: Cost of educational material purchased by states for use of agents.

Maine and Pennsylvania: Cost of temporary men while engaged in agent activities.

New Hampshire: Salary and expenses of Agent Cullen during month of August.

New York: Expenses of Agent Nichols.

New Jersey: Three quarters of state leader's salary and expenses except during April and May when only half of such expenditures were charged to this project.

(State for project costs)

Organization

State - \$100,000.00

Notes and Assumptions: Expenses for state leaders.
New Personnel: The salary and maintenance of state car (except tax and oil) for
state leader - state salary for permanent there are wages for any temporary
assistance on a part-time basis at \$10.00 per month.
Personnel: Salary \$150.00 per month and expenses of Assistant State Forester
for the part-time basis on a part-time basis.
Personnel: Expenses of \$150.00 per month for a permanent clerk of New Haven
for a part-time basis on a part-time basis.
Personnel: Salary \$150.00 per month - salary of temporary clerk who worked for two
months in office.
State Salary: One fourth of expenses paid by state to leader - arbitrary amount
of \$25.00 per month for clerical assistance at Providence office.
Personnel: State leader's salary and expenses are not charged against
state activities.
Personnel: One fourth of state leader's salary and expenses during winter year.
except April and May.
Personnel: Charge of \$100 per month from July to December for assistance at
Providence office, state leader's expenses and salary, and expenses of agent
for winter journey.

Personnel - \$100,000.00

Notes and Assumptions: Yearly salaries of state leaders - also in \$100,000.00
of \$25.00 per month for clerical assistance at state office.
Personnel: Salary and expenses of state leader - \$25.00 per month for clerical
assistance at state office.
Personnel: Charge of \$100 per month for assistance at Providence office.
Personnel: Charge of \$100 per month for assistance at Providence office.
Personnel: Charge of \$100 per month for assistance at Providence office.
Personnel: Charge of \$100 per month for assistance at Providence office.

U. S. Forest Service

State - \$100,000.00

Notes and Assumptions: Cost of educational material purchased by state for use of agents.
Personnel: Cost of \$100.00 per month for assistance at state office.
Personnel: Salary and expenses of Agent \$100.00 per month of journal.
Personnel: Charge of \$100 per month for assistance at Providence office.
Personnel: Charge of \$100 per month for assistance at Providence office.
Personnel: Charge of \$100 per month for assistance at Providence office.
Personnel: Charge of \$100 per month for assistance at Providence office.

Federal Expenditures

All States: Salaries and expenses of all permanent blister rust control agents (except expenses for Nichols in New York, Boomer in New Hampshire, and Swain for last half of calendar year in New Hampshire) - includes cost of 7 new federal cars purchased for agents.

Rhode Island and Connecticut: 3/4 of the salaries and expenses of the state leaders.

New Jersey: Three-quarters of state leader's salary except during April and May when only one-half of salary was charged to this project.

Pennsylvania: Three-quarters of state leader's salary and expenses.

Ribes Eradication

State Expenditures

All States: Wages of owners' labor, state linemen, scouts and foremen employed in pulling Ribes.

New York and Connecticut: Board and lodging costs of men in state camps.

Federal Expenditures

Maine, Rhode Island and Connecticut: Wages of temporary agents while employed scouting for Ribes.

Vermont, Massachusetts and Pennsylvania: Wages of federal foremen who assisted individual cooperators.

Eradication Assistants and Checkers

State Expenditures

New Hampshire: Salaries and expenses of two permanent assistants for year, except during period April 16 - June 30.

New York: Salaries and expenses of temporary assistants, including camp supervisor.

Pennsylvania: Salary and expenses of state agent May during eradication season

Federal Expenditures

New Hampshire: Salaries and expenses of two permanent assistants during period April 16 - June 30.

Black Currant Eradication

State Expenditures

Massachusetts, Rhode Island, Connecticut, and New York: Wages and expenses (if any) paid to state men engaged in eradicating Ribes nigrum when such work was conducted as a special project.

Federal Expenditures

Rhode Island and Connecticut: Wages paid temporary agents while employed on special black currant eradication project.

Developmental Level

The following information was obtained from the records of the
 Department of the Interior, Bureau of Land Management, at
 Washington, D. C., and is being furnished to you for your
 information.

not to get out of bed

2000-2001

1991年11月11日

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Report of the Board

Equilibrium of a beam

APR 10 - 1964

CONFIDENTIAL - SECURITY INFORMATION

1944-1945

Field Data

State Expenditures

New Hampshire: Wages and expenses of state scouts on work in Agent Boomer's district where none of areas scouted were cleared of Ribes by scouts.
Connecticut: Wages and expenses of state men while engaged in special studies including chemical eradication.
New York: Salaries and expenses of York, Snell, Littlefield, and their assistants on investigational work.
Pennsylvania: Salary and expenses of men on mapping work.

Nursery Sanitation

State Expenditures

Maine: Cost of Ribes eradication work around one commercial nursery and a \$500.00 allotment for general nursery inspection in Maine.
New Hampshire, Massachusetts and Rhode Island: Cost of Ribes eradication work around commercial nurseries.
Vermont and Pennsylvania: Cost of Ribes eradication work around state nurseries.
Connecticut: Cost of Ribes eradication work around ten commercial nurseries and one state nursery.
New York: Cost of Ribes eradication work around seven state nurseries and one commercial nursery.
New Jersey: Cost of Ribes eradication around one state nursery - also one-half of state leader's state salary and expenses during April and May while on work in connection with nursery sanitation.

Federal Expenditures

Massachusetts, Rhode Island, and Connecticut: Cost of temporary agent's time while on Ribes eradication work around nurseries.
New Jersey: One-half of state leader's federal salary during April and May while on work in connection with nursery sanitation.

Ribes Compensation

State Expenditures

New Hampshire, Massachusetts, and New York: Cost to states for cultivated Ribes compensation. There are still 3 outstanding compensation claims in Massachusetts for bushes eradicated in 1932. These claims will be settled in the spring of 1933.

Blister Rust Infection Pruning

State Expenditures

Maine: Cost of cutting out blister rust infection in plantations and from ornamental pines - all of these costs paid by individual cooperators.

Under this it shows a record of 10 persons for 1911: 1912: 1913: 1914: 1915: 1916: 1917: 1918: 1919: 1920: 1921: 1922: 1923: 1924: 1925: 1926: 1927: 1928: 1929: 1930: 1931: 1932: 1933: 1934: 1935: 1936: 1937: 1938: 1939: 1940: 1941: 1942: 1943: 1944: 1945: 1946: 1947: 1948: 1949: 1950: 1951: 1952: 1953: 1954: 1955: 1956: 1957: 1958: 1959: 1960: 1961: 1962: 1963: 1964: 1965: 1966: 1967: 1968: 1969: 1970: 1971: 1972: 1973: 1974: 1975: 1976: 1977: 1978: 1979: 1980: 1981: 1982: 1983: 1984: 1985: 1986: 1987: 1988: 1989: 1990: 1991: 1992: 1993: 1994: 1995: 1996: 1997: 1998: 1999: 2000: 2001: 2002: 2003: 2004: 2005: 2006: 2007: 2008: 2009: 2010: 2011: 2012: 2013: 2014: 2015: 2016: 2017: 2018: 2019: 2020: 2021: 2022: 2023: 2024: 2025: 2026: 2027: 2028: 2029: 2030: 2031: 2032: 2033: 2034: 2035: 2036: 2037: 2038: 2039: 2040: 2041: 2042: 2043: 2044: 2045: 2046: 2047: 2048: 2049: 2050: 2051: 2052: 2053: 2054: 2055: 2056: 2057: 2058: 2059: 2060: 2061: 2062: 2063: 2064: 2065: 2066: 2067: 2068: 2069: 2070: 2071: 2072: 2073: 2074: 2075: 2076: 2077: 2078: 2079: 2080: 2081: 2082: 2083: 2084: 2085: 2086: 2087: 2088: 2089: 2090: 2091: 2092: 2093: 2094: 2095: 2096: 2097: 2098: 2099: 2100: 2101: 2102: 2103: 2104: 2105: 2106: 2107: 2108: 2109: 2110: 2111: 2112: 2113: 2114: 2115: 2116: 2117: 2118: 2119: 2120: 2121: 2122: 2123: 2124: 2125: 2126: 2127: 2128: 2129: 2130: 2131: 2132: 2133: 2134: 2135: 2136: 2137: 2138: 2139: 2140: 2141: 2142: 2143: 2144: 2145: 2146: 2147: 2148: 2149: 2150: 2151: 2152: 2153: 2154: 2155: 2156: 2157: 2158: 2159: 2160: 2161: 2162: 2163: 2164: 2165: 2166: 2167: 2168: 2169: 2170: 2171: 2172: 2173: 2174: 2175: 2176: 2177: 2178: 2179: 2180: 2181: 2182: 2183: 2184: 2185: 2186: 2187: 2188: 2189: 2190: 2191: 2192: 2193: 2194: 2195: 2196: 2197: 2198: 2199: 2200: 2201: 2202: 2203: 2204: 2205: 2206: 2207: 2208: 2209: 2210: 2211: 2212: 2213: 2214: 2215: 2216: 2217: 2218: 2219: 2220: 2221: 2222: 2223: 2224: 2225: 2226: 2227: 2228: 2229: 2230: 2231: 2232: 2233: 2234: 2235: 2236: 2237: 2238: 2239: 2240: 2241: 2242: 2243: 2244: 2245: 2246: 2247: 2248: 2249: 2250: 2251: 2252: 2253: 2254: 2255: 2256: 2257: 2258: 2259: 2260: 2261: 2262: 2263: 2264: 2265: 2266: 2267: 2268: 2269: 2270: 2271: 2272: 2273: 2274: 2275: 2276: 2277: 2278: 2279: 2280: 2281: 2282: 2283: 2284: 2285: 2286: 2287: 2288: 2289: 2290: 2291: 2292: 2293: 2294: 2295: 2296: 2297: 2298: 2299: 2300: 2301: 2302: 2303: 2304: 2305: 2306: 2307: 2308: 2309: 2310: 2311: 2312: 2313: 2314: 2315: 2316: 2317: 2318: 2319: 2320: 2321: 2322: 2323: 2324: 2325: 2326: 2327: 2328: 2329: 2330: 2331: 2332: 2333: 2334: 2335: 2336: 2337: 2338: 2339: 2340: 2341: 2342: 2343: 2344: 2345: 2346: 2347: 2348: 2349: 2350: 2351: 2352: 2353: 2354: 2355: 2356: 2357: 2358: 2359: 2360: 2361: 2362: 2363: 2364: 2365: 2366: 2367: 2368: 2369: 2370: 2371: 2372: 2373: 2374: 2375: 2376: 2377: 2378: 2379: 2380: 2381: 2382: 2383: 2384: 2385: 2386: 2387: 2388: 2389: 2390: 2391: 2392: 2393: 2394: 2395: 2396: 2397: 2398: 2399: 2400: 2401: 2402: 2403: 2404: 2405: 2406: 2407: 2408: 2409: 2410: 2411: 2412: 2413: 2414: 2415: 2416: 2417: 2418: 2419: 2420: 2421: 2422: 2423: 2424: 2425: 2426: 2427: 2428: 2429: 2430: 2431: 2432: 2433: 2434: 2435: 2436: 2437: 2438: 2439: 2440: 2441: 2442: 2443: 2444: 2445: 2446: 2447: 2448: 2449: 2450: 2451: 2452: 2453: 2454: 2455: 2456: 2457: 2458: 2459: 2460: 2461: 2462: 2463: 2464: 2465: 2466: 2467: 2468: 2469: 2470: 2471: 2472: 2473: 2474: 2475: 2476: 2477: 2478: 2479: 2480: 2481: 2482: 2483: 2484: 2485: 2486: 2487: 2488: 2489: 2490: 2491: 2492: 2493: 2494: 2495: 2496: 2497: 2498: 2499: 2500: 2501: 2502: 2503: 2504: 2505: 2506: 2507: 2508: 2509: 2510: 2511: 2512: 2513: 2514: 2515: 2516: 2517: 2518: 2519: 2520: 2521: 2522: 2523: 2524: 2525: 2526: 2527: 2528: 2529: 2530: 2531: 2532: 2533: 2534: 2535: 2536: 2537: 2538: 2539: 2540: 2541: 2542: 2543: 2544: 2545: 2546: 2547: 2548: 2549: 2550: 2551: 2552: 2553: 2554: 2555: 2556: 2557: 2558: 2559: 2560: 2561: 2562: 2563: 2564: 2565: 2566: 2567: 2568: 2569: 2570: 2571: 2572: 2573: 2574: 2575: 2576: 2577: 2578: 2579: 2580: 2581: 2582: 2583: 2584: 2585: 2586: 2587: 2588: 2589: 2590: 2

NOTICE

rejection of death

Miscellaneous

State and Federal Expenditures

All States: Cost of miscellaneous items not directly chargeable to any of the other blister rust control projects.

Table 40.- Total State Expenditures During the Calendar Year 1932 for the Various Blister Rust Control Projects in the Respective Northeastern States

State	Super- Vision	B.R.C. Agent Act.	Erad.As- sist's & Checkers	Regular Ribes Erad.	Black Currant Erad.	Nursery Sanita- tion	Ribes Compen- sation	Field Data	Infec- tion Pruning	Misc.	Total
Me.	873.18	1,047.30	-	15,268.92	-	511.60*	-	-	977.12	60.87	18,738.99
N.H.	1,320.83	368.72	4,499.67	17,647.93	-	35.64	8.68	540.84	-	192.46	24,614.77
Vt.	637.91	78.30	-	3,648.47	-	187.03	-	-	-	38.76	4,590.47
Mass.	431.06	62.65	-	15,727.41	2,387.99	463.07	188.00	-	-	-	19,260.18
R.I.	379.50	397.64	-	1,213.02	982.49	343.56	-	-	-	2.00	3,318.21
Conn.	2,041.14	39.78	-	3,219.40	876.33	604.67	-	1,761.52	-	646.37	9,189.21
N.Y.	-	424.65	5,964.95	53,486.93	5,030.74	3,737.34	292.45	9,771.95	-	-	78,709.01
N.E. & N.Y.	5,683.62	2,419.04	10,464.62	110,212.08	9,277.55	5,882.91	489.13	12,074.31	977.12	940.46	158,420.84
N.J.	312.18	1,057.52	-	-	-	146.56	-	-	-	-	1,516.26
Pa.	1,118.13	1,965.90	1,300.04	7,171.15	-	225.25	-	451.48	-	45.88	12,277.83
All States	7,113.93	5,442.46	11,764.66	117,383.23	9,277.55	6,254.72	489.13	12,525.79	977.12	986.34	172,214.93

Per Cent of Total State Expenditures in The Respective Northeastern States Paid for Each Project

State	Super- vision	B.R.C. Agent Act.	Erad. As- sist's & Checkers	Regular Ribes Erad.	Black Currant Erad.	Nursery Sanita- tion	Ribes Compen- sation	Field Data	Infec- tion Pruning	Misc.	Total
Me.	4.7	5.6	-	81.5	-	2.7*	-	-	5.2	0.3	100.0
N.H.	5.37	1.5	18.28	71.7	-	.14	.03	2.2	-	.78	100.0
Vt.	13.9	1.7	-	79.5	-	4.1	-	-	-	0.8	100.0
Mass.	2.2	0.3	-	81.7	12.4	2.4	1.0	-	-	-	100.0
R.I.	11.44	11.98	-	36.56	29.61	10.35	-	-	-	.06	100.0
Conn.	22.2	0.4	-	35.0	9.5	6.6	-	19.2	-	7.1	100.0
N.Y.	-	0.5	7.6	68.0	6.4	4.7	0.4	12.4	-	-	100.0
N.E. & N.Y.	3.6	1.5	6.6	69.6	5.9	3.7	0.3	7.6	0.6	0.6	100.0
N.J.	20.6	69.7	-	-	-	9.7	-	-	-	-	100.0
Pa.	9.1	16.0	10.6	58.4	-	1.8	-	3.7	-	0.4	100.0
All States	4.1	3.1	6.8	68.2	5.4	3.6	0.3	7.3	0.6	0.6	100.0

*Includes \$500 state appropriation funds used on general nursery inspection work.

Table No. - Total State Expenditures During the Calendar Year 1972 for the Various Major Projects in the Respective Northwestern States

Project	Alaska	Arizona	California	Colorado	Idaho	Montana	Nevada	New Mexico	North Dakota	South Dakota	Utah	Wyoming
Water	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00
Electricity	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00
Transportation	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00
Health	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00
Education	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00
Other	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00
Total	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00	1,200.00

Per Cent of Total State Expenditures in the Respective Northwestern States for Each Project

Project	Alaska	Arizona	California	Colorado	Idaho	Montana	Nevada	New Mexico	North Dakota	South Dakota	Utah	Wyoming
Water	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Electricity	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Transportation	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Health	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Education	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Other	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

*Includes \$500 state appropriation funds used on general nursery inspection work.

Table 41.- Total Federal Expenditures During The Calendar Year 1932 For The Various Blister Rust Control Projects in The Respective Northeastern States

State	Supervision	B.R.C. Agent Act.	Erad. As- sist's & Checkers	Ribes Erad.	Black Currant Erad.	Nursery Sanita- tion	Field Data	Misc.	Total
Ala.	3,354.00	12,824.39	-	1,346.04	-	-	-	-	17,524.43
Ark.	3,587.74	17,706.70	1,004.22	-	-	-	-	16.73	22,315.39
Cal.	-	4,115.92	-	127.07	-	-	-	-	4,242.99
Conn.	3,672.67	12,777.32	-	910.00	-	10.00	-	8.97	17,378.96
Del.	515.69	1,551.47	-	452.04	201.86	162.87	-	30.00	2,913.93
Ill.	943.28	3,714.56	-	1,373.00	770.00	5.33	-	58.89	6,865.06
Iowa	55.01	26,491.87	-	-	-	-	-	93.68	26,640.56
Mass.	-	-	-	-	-	-	-	-	-
Mich.	12,128.39	79,182.23	1,004.22	4,208.15	971.86	178.20	-	208.27	97,881.32
Minn.	237.46	813.00	-	-	-	100.00	-	-	1,150.46
Mo.	682.05	6,437.11	-	516.00	-	-	-	2.83	7,637.99
N. Y.	-	-	-	-	-	-	-	-	-
Ohio	-	-	-	-	-	-	-	-	-
Pa.	-	-	-	-	-	-	-	-	-
all States	13,047.90	86,432.34	1,004.22	4,724.15	971.86	278.20	-	211.10	106,669.77

Percentage of Total Federal Expenditures in Respective Northeastern States Paid For Each Project

State	Supervision	B.R.C. Agent Act.	Erad. As- sist's & Checkers	Ribes Erad.	Black Currant Erad.	Nursery Sanita- tion	Field Data	Misc.	Total
Ala.	19.1	73.2	-	7.7	-	-	-	-	100.0
Ark.	16.07	79.35	4.5	-	-	-	-	.08	100.0
Cal.	-	97.0	-	3.0	-	-	-	-	100.0
Conn.	21.13	73.52	-	5.24	-	.06	-	.05	100.0
Del.	17.7	53.3	-	15.5	6.9	5.6	-	1.0	100.0
Ill.	13.7	54.1	-	20.0	11.2	0.1	-	0.9	100.0
Iowa	0.2	99.4	-	-	-	-	-	0.4	100.0
Mass.	-	-	-	-	-	-	-	-	-
Mich.	12.4	80.9	1.0	4.3	1.0	0.2	-	0.2	100.0
Minn.	20.6	70.7	-	-	-	8.7	-	-	100.0
Mo.	8.93	84.28	-	6.75	-	-	-	.04	100.0
N. Y.	-	-	-	-	-	-	-	-	-
Ohio	-	-	-	-	-	-	-	-	-
Pa.	-	-	-	-	-	-	-	-	-
all States	12.2	81.0	1.0	4.4	.9	.3	-	.2	100.0

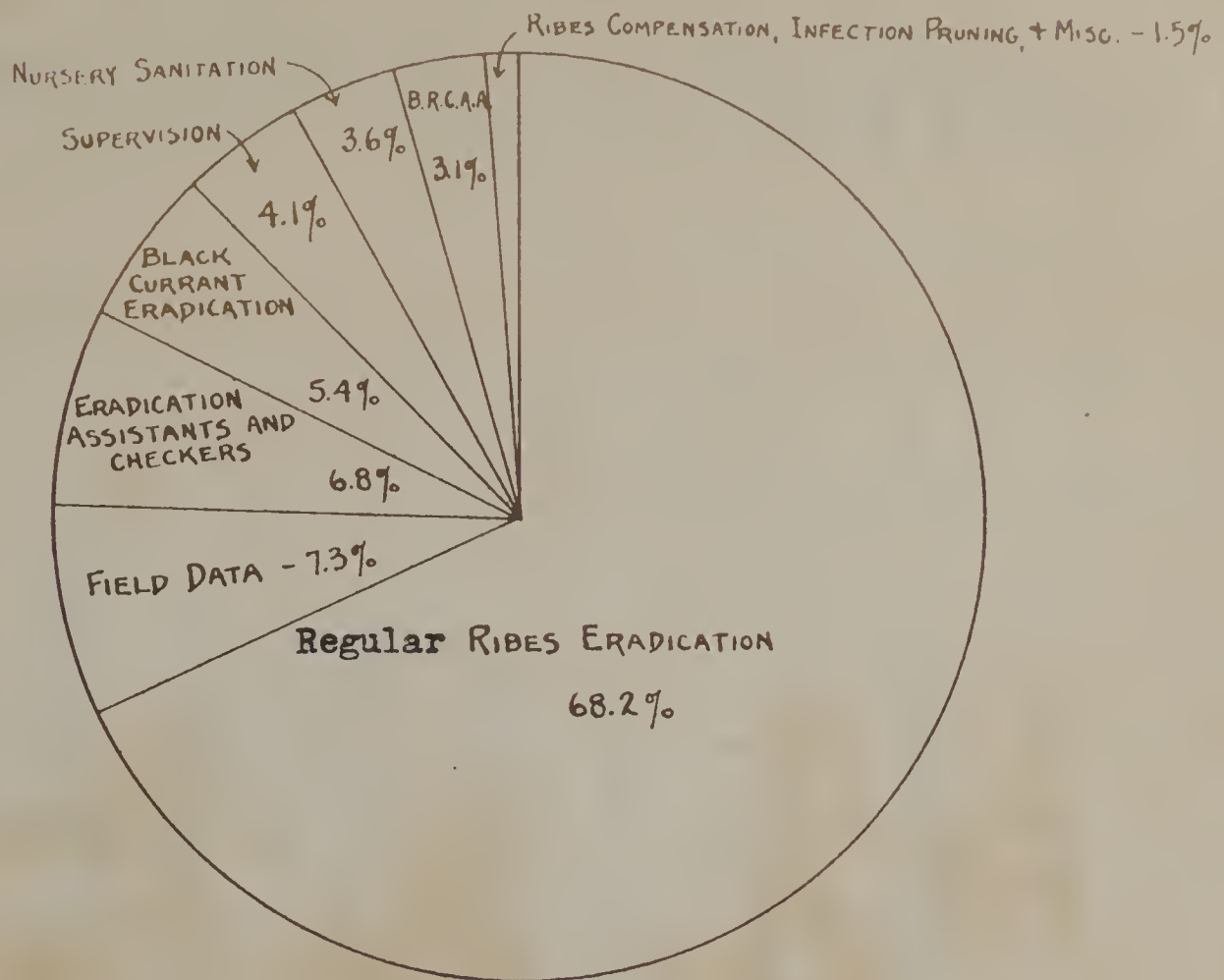
Table 1. - Total 1954 production of cotton in the United States
 by State and District. (In thousands of bales)

State or District	Production	Area	Yield	Value	Per cent of 1953	Per cent of 1954	Per cent of 1955
Alabama	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Arkansas	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
California	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Florida	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Georgia	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Illinois	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Indiana	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Iowa	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Kansas	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Mississippi	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Missouri	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Montana	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Nebraska	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Nevada	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
New Mexico	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
North Carolina	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Ohio	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Oklahoma	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Oregon	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
South Carolina	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
South Dakota	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Tennessee	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Texas	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Utah	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Vermont	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Virginia	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Washington	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
West Virginia	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Wisconsin	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Wyoming	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Total	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0

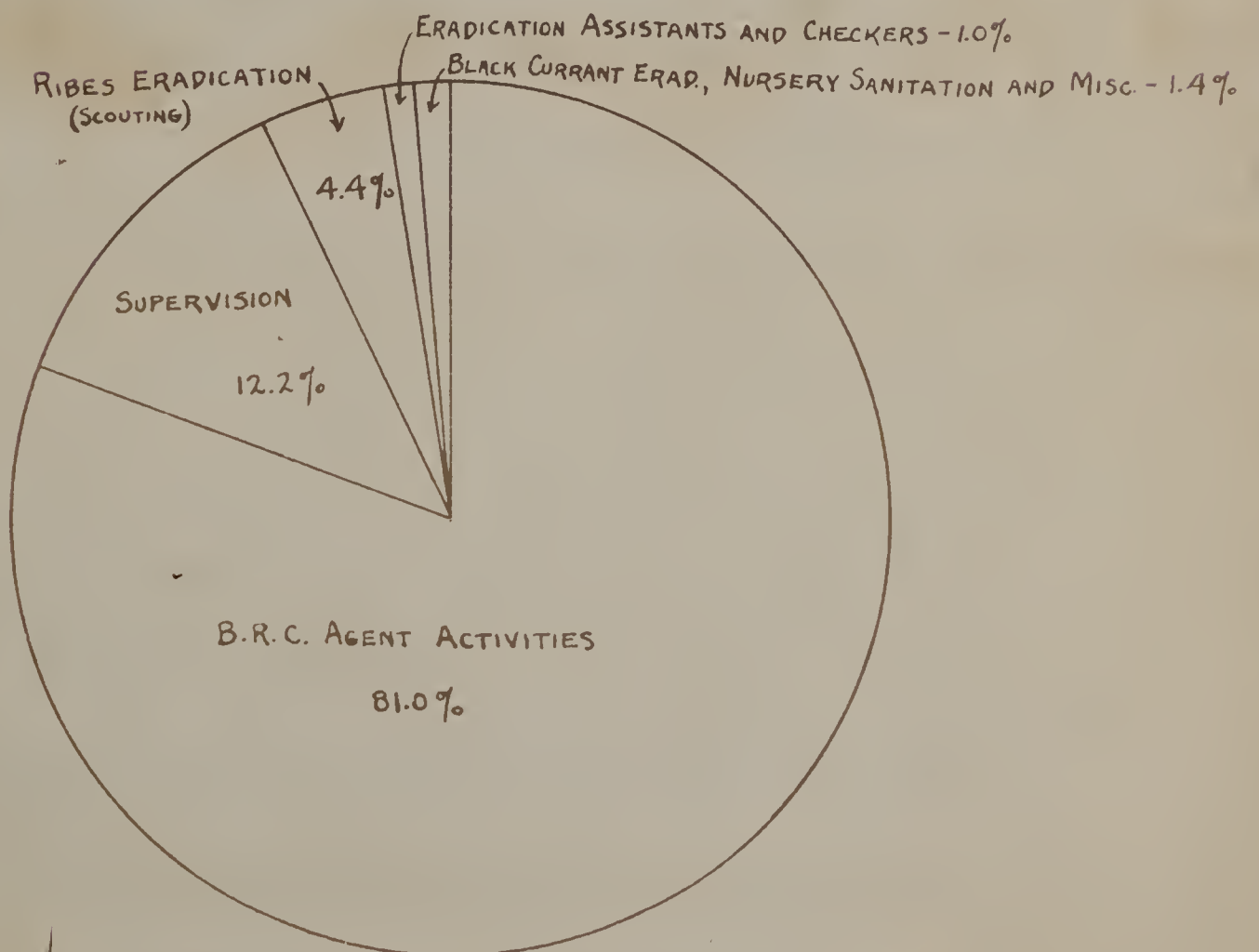
Table 2. - Total 1954 production of cotton in the United States
 by State and District. (In thousands of bales)

State or District	Production	Area	Yield	Value	Per cent of 1953	Per cent of 1954	Per cent of 1955
Alabama	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Arkansas	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
California	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Florida	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Georgia	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Illinois	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Indiana	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Iowa	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Kansas	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Mississippi	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Missouri	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Montana	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Nebraska	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Nevada	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
New Mexico	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
North Carolina	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Ohio	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Oklahoma	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Oregon	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
South Carolina	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
South Dakota	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Tennessee	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Texas	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Utah	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Vermont	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Virginia	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Washington	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
West Virginia	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Wisconsin	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Wyoming	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0
Total	1,100.0	1,100.0	1.0	1.0	100.0	100.0	100.0

STATE AND FEDERAL EXPENDITURES IN NORTHEASTERN STATES DURING CALENDAR YEAR 1932. (PERCENTAGE OF TOTAL SPENT ON EACH PROJECT)

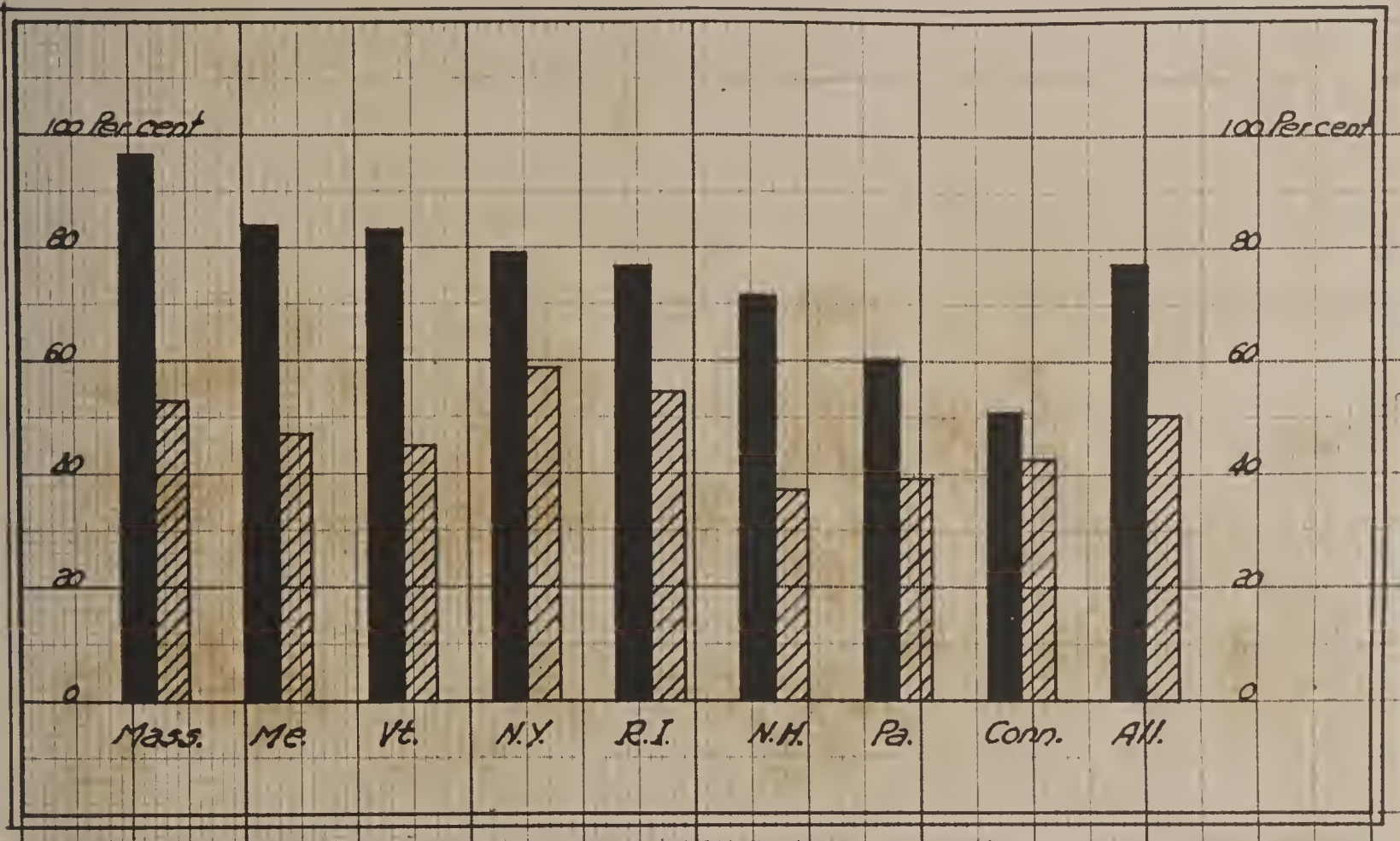


TOTAL STATE EXPENDITURES - \$172,214.93



TOTAL FEDERAL EXPENDITURES - \$106,669.77

PERCENTAGE OF TOTAL EXPENDITURES IN THE VARIOUS NORTHEASTERN STATES
DURING 1932 USED FOR THE ACTUAL WORK OF LOCATING AND PULLING
RIBES



■ State Expenditures

▨ State and Federal Expenditures

Note: Includes regular Ribes eradication, black currant eradication, and nursery sanitation in all states except New Jersey.

PERCENTAGE OF TOTAL EXPENDITURES IN THE VARIOUS NORTHWESTERN STATES
 DURING 1932 USED FOR THE ACTUAL WORK OF LOCATING AND FILLING
 RIBS



GRAPH

State Expenditures

State and Federal Expenditures

Note: Includes various ribs expenditures. Black current expenditure,
 and nursery expenditure in all states except New Jersey.

Table 42.- Total State and Federal Expenditures During The Calendar Year 1932 For The Various Blister Rust Control Projects in The Respective Northeastern States

State	Super- vision	B.R.C. Agent Act.	Erad.As- sist's & Checkers	Ribes Erad.	Black Currant Erad.	Nursery Sanita- tion	Ribes Compen- sation	Field Data	Infec- tion Pruning	Misc.	Total
Me.	4,227.18	13,871.69	-	16,614.96	-	* 511.60	-	-	977.12	60.87	36,263.42
N.H.	4,908.57	18,075.42	5,503.89	17,647.93	-	35.64	8.68	540.84	-	209.19	46,930.16
Vt.	637.91	4,194.22	-	3,775.54	-	187.03	-	-	-	38.76	8,833.46
Mass.	4,103.73	12,839.97	-	16,637.41	2,387.99	473.07	188.00	-	-	8.97	36,639.14
R.I.	895.19	1,949.11	-	1,665.06	1,184.35	506.43	-	-	-	32.00	6,232.14
Conn.	2,984.42	3,754.34	-	4,592.40	1,646.33	610.00	-	1,761.52	-	705.26	16,054.27
N.Y.	55.01	26,916.52	5,964.95	53,486.93	5,030.74	3,737.34	292.45	9,771.95	-	93.68	105,349.57
N.E.& N.Y.	17,812.01	81,601.27	11,468.84	14,420.23	10,249.41	6,061.11	489.13	12,074.31	977.12	1,148.73	256,302.16
N.J.	549.64	1,870.52	-	-	-	246.56	-	-	-	-	2,666.72
Pa.	1,800.18	8,403.01	1,300.04	7,687.15	-	225.25	-	451.48	-	48.71	19,915.82
All States	20,161.83	91,874.80	12,768.88	122,107.38	10,249.41	6,532.92	489.13	12,525.79	977.12	1,197.44	278,884.70

Percentage of Total State and Federal Expenditures in The Respective Northeastern States Paid For Each Project

State	Super- vision	B.R.C. Agent Act.	Erad.As- sist's & Checkers	Ribes Erad.	Black Currant Erad.	Nursery Sanita- tion	Ribes Compen- sation	Field Data	Infec- tion Pruning	Misc.	Total
Me.	11.7	38.2	-	45.8	-	1.4*	-	-	2.7	0.2	100.0
N.H.	10.46	38.52	11.73	37.60	-	0.07	0.02	1.15	-	0.45	100.0
Vt.	7.2	47.5	-	42.8	-	2.1	-	-	-	0.4	100.0
Mass.	11.2	35.0	-	45.4	6.5	1.3	0.5	-	-	0.1	100.0
R.I.	14.4	31.3	-	26.7	19.0	8.1	-	-	-	0.5	100.0
Conn.	18.6	23.4	-	28.6	10.2	3.8	-	11.0	-	4.4	100.0
N.Y.	0.5	25.5	5.6	50.7	4.7	3.4	0.3	9.2	-	0.1	100.0
N.E.& N.Y.	7.0	31.8	4.5	44.6	4.0	2.4	0.2	4.7	0.4	0.4	100.00
N.J.	20.6	70.2	-	-	-	9.2	-	-	-	-	100.0
Pa.	9.0	42.2	6.5	38.6	-	1.1	-	2.3	-	0.3	100.0
All States	7.2	32.9	4.6	43.8	3.7	2.3	.2	4.5	.4	.4	100.0

*Includes \$500 state appropriation funds used in general nursery inspection work.

Table 25. - Total State and Federal Expenditures for Highway Construction for the Various Districts in the Northeastern States

District	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	Total
Atlantic States	10.1	11.2	12.5	13.8	15.1	16.4	17.7	19.0	20.3	21.6	22.9	24.2	25.5	26.8	28.1	29.4	210.0
New England	2.1	2.3	2.5	2.7	2.9	3.1	3.3	3.5	3.7	3.9	4.1	4.3	4.5	4.7	4.9	5.1	35.0
Mid-Atlantic	3.2	3.5	3.8	4.1	4.4	4.7	5.0	5.3	5.6	5.9	6.2	6.5	6.8	7.1	7.4	7.7	50.0
Piedmont	4.8	5.2	5.6	6.0	6.4	6.8	7.2	7.6	8.0	8.4	8.8	9.2	9.6	10.0	10.4	10.8	70.0
Appalachian	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Northwest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Southwest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mountain	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rocky Mountain	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pacific	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Far West	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alaska	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hawaii	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	10.1	11.2	12.5	13.8	15.1	16.4	17.7	19.0	20.3	21.6	22.9	24.2	25.5	26.8	28.1	29.4	210.0

*Excludes \$500 state contribution made in Federal Highway Act of 1955

District	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	Total
Atlantic States	10.1	11.2	12.5	13.8	15.1	16.4	17.7	19.0	20.3	21.6	22.9	24.2	25.5	26.8	28.1	29.4	210.0
New England	2.1	2.3	2.5	2.7	2.9	3.1	3.3	3.5	3.7	3.9	4.1	4.3	4.5	4.7	4.9	5.1	35.0
Mid-Atlantic	3.2	3.5	3.8	4.1	4.4	4.7	5.0	5.3	5.6	5.9	6.2	6.5	6.8	7.1	7.4	7.7	50.0
Piedmont	4.8	5.2	5.6	6.0	6.4	6.8	7.2	7.6	8.0	8.4	8.8	9.2	9.6	10.0	10.4	10.8	70.0
Appalachian	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Northwest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Southwest	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mountain	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rocky Mountain	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pacific	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Far West	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Alaska	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hawaii	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	10.1	11.2	12.5	13.8	15.1	16.4	17.7	19.0	20.3	21.6	22.9	24.2	25.5	26.8	28.1	29.4	210.0

Table 43.- Total Cost of All Cooperative Blister Rust Control Activities in Northeastern States, 1918-1932, Inclusive.

State	State B.R. Appropriations	Funds From Other State Appropriations	Town Funds	Individual Funds or Labor	County Funds	Federal \$ For \$ Expenditures	Total
Me.	83,581.75	9,205.20	85,088.44	83,147.09	-	229,732.58	490,755.06
N.H.	232,438.80*	-	348,348.27	46,637.69	-	417,604.42	1,045,029.18
Vt.	48,795.07	-	1,077.91	69,526.78	-	114,580.69	233,980.45
Mass.	216,875.82	47,925.55	1,699.22	83,630.55	-	310,242.82	660,373.96
R.I.	39,925.91	2,013.83	-	581.36	-	42,262.67	84,783.77
Conn.	102,997.59	1,127.82	12,187.89	8,354.29	-	95,146.31	219,813.90
N.Y.	832,018.87	15,331.68	-	161,290.40	5,898.80	463,276.22	1,477,815.97
N.E. & N.Y.	1,556,633.81	75,604.08	448,401.73	453,168.16	5,898.80	1,672,845.71	4,212,552.29
N.J.	7,222.89	22.20	-	-	-	5,596.80	12,841.89
Pa.	47,019.97	300.82	-	1,270.69	-	27,098.38	75,689.86
All States	1,610,876.67	75,927.10	448,401.73	454,438.85	5,898.80	1,705,540.89	4,301,084.04

*Includes \$224.11 state appropriation money expended for control work on White Mountain National Forest.

In addition to the above expenditures on cooperative control work in the Northeastern States, government funds have been spent on strictly federal projects conducted at Acadia National Park, White Mountain National Forest, and Allegheny National Forest.

Total Expenditures on Strictly Federal Projects

<u>Project</u>	<u>Park Service</u>	<u>Forest Service</u>	<u>B.P.I.</u>	<u>Total</u>
Acadia National Park	9,639.44	-	7,318.55	16,957.99
White Mountain National Forest	-	1,946.91	550.92	2,497.83
Allegheny National Forest	-	478.80	838.61	1,317.41
Total	9,639.44	2,425.71	8,708.08	20,773.23

The State of New Hampshire also spent \$224.11 in connection with the control work on the White Mountain National Forest - this expenditure is included under Table 43.

Table 17 - Total Cost of All Government Projects in National Forest, 1912-1932

Project	State & Federal	Private	Interest	County	General
1. Clearing	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89
2. Road	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89
3. Dam	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89
4. Bridge	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89
5. Fire	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89
6. Reclamation	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89
7. Other	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89
Total	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89

*In addition to the above expenditures on reclamation work in the National Forest, Government funds have been spent on other projects connected with the National Forest, White Mountain National Forest, and Allegheny National Forest.

Total Expenditures on National Forest Projects

Project	State & Federal	Private	Interest	County	General
1. Clearing	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89
2. Road	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89
3. Dam	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89
4. Bridge	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89
5. Fire	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89
6. Reclamation	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89
7. Other	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89
Total	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89	1,234,567.89

The amount of the expenditures for the National Forest in the State of New York is shown in the following table.

Table 44.- Relation of Total Cost of All Control Activities to Total Commercial Value of White Pine in Northeastern States.

State	Acreage of White Pine	Commercial Value of White Pine	Cost of All Control Activities	Per Cent of Total Commercial Value Represented by Cost of All Control Activities	Per Cent of Total Control Area Protected.	
					Initial	Re-Prod.
Me.	2,608,911	102,109,599	507,713.05	0.5	66.6	0.9
N.H.	1,544,033	68,919,198	1,047,527.01	1.5	83.9	11.4
Vt.	567,084	18,339,854	233,980.45	1.3	61.9	10.2
Mass.	958,564	44,257,012	660,373.96	1.5	99.0	19.1
R.I.	73,196	2,002,053	84,783.77	4.2	100.0	6.2
Conn.	216,154	10,240,416	219,813.90	2.1	95.8	13.9
N.Y.	1,315,957	57,127,222	1,477,815.97	2.6	59.0	3.5
N.E. & N.Y.	7,283,899	302,995,354	4,232,008.11	1.4	77.0	8.0
Pa.	375,628	12,475,437	77,007.27	0.6	11.3	0.7

The basis for acreages and values of white pine are given on pages 1 and 2.

The amounts listed under "Cost of All Control Activities" include the expenditures for the strictly federal control projects at Acadia National Park, White Mountain National Forest, and Allegheny National Forest.

Table 45.- Results and Cost of Ribes Eradication Project in Northeastern States
(1918-1932, Inclusive)

State	Total Acre- age Cleared of Ribes (Initial & Re-Erad.)	Estimated Acreage White Pine Protected		Est. Percentage Pine (in control area) Protected		Ribes * Eradicated (Wild & Cult.)	Total Cost** of Ribes Eradication	Total Cost of All Control Activities
		Initial	Re-Erad.	Initial	Re-Erad.			
Me.	2,783,053	1,185,866	16,417	66.6	0.9	19,965,264	242,125.54	507,713.05
N.H.	3,029,232	1,296,173	176,034	83.9	11.4	36,329,040	584,638.59	1,047,527.01
Vt.	217,743	74,754	12,343	61.9	10.2	2,274,570	92,912.87	233,980.45
Mass.	2,113,369	923,699	178,669	99.0	19.1	13,772,028	308,346.08	660,373.96
R.I.	290,064	73,196	4,525	100.0	6.2	212,831	32,238.35	84,783.77
Conn.	262,873	134,134	19,471	95.8	13.9	2,018,095	73,667.47	219,813.90
N.Y.	863,085	489,217	28,634	59.0	3.5	19,416,287	716,127.29	1,477,815.97
N.E. & N.Y.	9,559,419	4,177,039	436,093	77.1	8.0	93,881,115	2,050,056.19	4,232,008.11
N.J.	-	-	-	-	-	-	-	12,841.89
Pa.	65,268	24,573	1,534	11.3	0.7	2,719,342	31,325.40	77,007.27
All States	9,624,687	4,201,612	437,627	74.5	7.8	96,707,457	2,081,381.59	4,321,857.27

*Does not include bushes pulled in connection with special nursery sanitation and black currant eradication projects.

**Does not include cost of special nursery sanitation and black currant eradication projects.

The basis for estimating the acreages of pine protected in the various Northeastern States are given on page 37 in the analysis of the status of control summary.

Per Acre Values

(For Table 45)

State	Ribes Per Acre	Cost Per Acre							
		Based on Ribes Eradication Costs Only				Based on Total Expenditures			
		1918 - 1932		Ave. Per Year		1918 - 1932		Ave. Per Year	
		Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected
Me.	7.1	.087	.201	.006	.013	.182	.422	.012	.028
N.H.	11.9	.193	.397	.013	.026	.346	.712	.023	.047
Vt.	10.4	.427	1.07	.028	.071	1.07	2.69	.071	.179
Mass.	6.4	.146	.280	.010	.019	.312	.599	.021	.040
R.I.	0.69	.111	.415	.007	.028	.292	1.09	.019	.073
Conn.	7.6	.280	.480	.019	.032	.836	1.43	.056	.095
N.Y.	22.4	.830	1.38	.055	.092	1.71	2.85	.114	.190
N.E.& N.Y.	9.8	.214	.444	.014	.029	.443	.917	.029	.061
Pa.	41.6	.480	1.20	.120	.300	1.18	2.95	.295	1.37

No satisfactory comparison can be made between the per acre costs in the various states, due to numerous factors which directly influence the cost of the eradication work. For instance, about 85% of the acreage worked in Maine has been covered by scouts. This has been possible because of the localized distribution of the Ribes. For this reason, the per acre costs in Maine are considerably lower than in the other states. It will be noted in Rhode Island that the cost per acre of pine protected is much greater than the per acre cost based on total area worked. A large acreage of potential pine land has been cleared of Ribes in that state. The small isolated pine areas in Vermont have necessitated larger proportionate protection zones, thus increasing the cost per acre of pine protected. In New York, the cost has been increased by the size and abundance of Ribes, the ruggedness of the topography, and the inaccessibility of many of the control areas.

The compilation of per acre values on the basis of total costs is hardly justified because they include expenditures for such projects as field investigations and black currant eradication, which are not directly related to the regular Ribes eradication work, particularly the latter cannot be figured on a per acre basis.

Table 1

(Total = 100)

Year		Total no. of cases		Total no. of deaths		Total no. of recoveries		Total no. of cures		
Year	Total no. of cases	Total no. of deaths	Total no. of recoveries	Year	Total no. of deaths	Total no. of recoveries	Year	Total no. of cures	Total no. of cures	
1951	100	10	90	1952	120	12	108	1953	150	15
1954	180	18	162	1955	200	20	180	1956	250	25
1957	300	30	270	1958	350	35	315	1959	400	40
1960	450	45	405	1961	500	50	450	1962	550	55
1963	600	60	540	1964	650	65	585	1965	700	70
1966	750	75	675	1967	800	80	720	1968	850	85
1969	900	90	810	1970	950	95	855	1971	1000	100
1972	1100	110	990	1973	1200	120	1080	1974	1300	130
1975	1400	140	1260	1976	1500	150	1350	1977	1600	160
1978	1700	170	1530	1979	1800	180	1620	1980	1900	190
1981	2000	200	1800	1982	2100	210	1890	1983	2200	220
1984	2300	230	2070	1985	2400	240	2160	1986	2500	250
1987	2600	260	2340	1988	2700	270	2430	1989	2800	280
1990	2900	290	2610	1991	3000	300	2700	1992	3100	310
1993	3200	320	2880	1994	3300	330	2970	1995	3400	340
1996	3500	350	3150	1997	3600	360	3240	1998	3700	370
1999	3800	380	3420	2000	3900	390	3510	2001	4000	400
2002	4100	410	3690	2003	4200	420	3780	2004	4300	430
2005	4400	440	3960	2006	4500	450	4050	2007	4600	460
2008	4700	470	4230	2009	4800	480	4320	2010	4900	490
2011	5000	500	4500	2012	5100	510	4590	2013	5200	520
2014	5300	530	4770	2015	5400	540	4860	2016	5500	550
2017	5600	560	5040	2018	5700	570	5130	2019	5800	580
2020	5900	590	5310	2021	6000	600	5400	2022	6100	610
2023	6200	620	5580	2024	6300	630	5670	2025	6400	640
2026	6500	650	5850	2027	6600	660	5940	2028	6700	670
2029	6800	680	6120	2030	6900	690	6230	2031	7000	700
2032	7100	710	6400	2033	7200	720	6480	2034	7300	730
2035	7400	740	6660	2036	7500	750	6750	2037	7600	760
2038	7700	770	6930	2039	7800	780	7020	2040	7900	790
2041	8000	800	7200	2042	8100	810	7290	2043	8200	820
2044	8300	830	7470	2045	8400	840	7560	2046	8500	850
2047	8600	860	7740	2048	8700	870	7830	2049	8800	880
2050	8900	890	8010	2051	9000	900	8100	2052	9100	910
2053	9200	920	8280	2054	9300	930	8370	2055	9400	940
2056	9500	950	8550	2057	9600	960	8640	2058	9700	970
2059	9800	980	8820	2060	9900	990	8910	2061	10000	1000

REPORT ON THE CONTROL OF BLISTER RUST

Summary and Conclusions of the First Year

Item	Amount	Total
Blister rust control (1918-1932) - Total	7,115,000	7,115,000
Blister rust control (1918-1932) - Total	7,115,000	7,115,000

SUMMARY, BY STATES, OF COOPERATIVE BLISTER RUST CONTROL
ACTIVITIES DURING THE PERIOD 1918-1932, INCLUSIVE

Blister rust control activities during the period 1918-1932, inclusive, were carried out in the following states: ...

Blister rust control activities during the period 1918-1932, inclusive, were carried out in the following states: ...

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Blister Rust Control

Blister rust control activities during the period 1918-1932, inclusive, were carried out in the following states: ...

Blister Rust Control

Blister rust control activities during the period 1918-1932, inclusive, were carried out in the following states: ...

SUMMARY, BY STATES, OF COOPERATIVE EFFORTS FOR CONTROL

ACTIVITIES DURING THE PERIOD 1918-1935, INCLUSIVE

BLISTER RUST CONTROL IN MAINE

Acreage and Commercial Value of White Pine

	<u>Acreage</u>	<u>Value</u>
Pure white pine (80-100% pine) - {Over 6" DBH.....	304,790	\$34,136,480.
Under 6" DBH.....	284,490	7,112,250.
Mixed white pine - {21-29% pine in mixture.....	248,258	6,951.
{30-79% pine in mixture.....	794,915	44,515
Other types with scattered white pine stocking and restocking*.....	976,458	{6,835, 1,218,040
White pine restocking in pure merchantable and mixed white pine types.....	727,269**	1,341,153.
Totals.....	2,608,911	\$102,109,599.

32

*Excludes those "other types" which have 1-20% pine (above restocking size), but do not contain white pine restocking.

**This acreage not included in total as it is already listed under pure and mixed white pine types.

Basis for estimating value of white pine: merchantable stumpage figured at normal value of \$7 per M - average volume per acre, pure merchantable white pine = 16 M bd. ft.; mixed white pine, 21-29% = 4 M bd.ft.; mixed white pine, 30-79% = 8 M bd.ft.; and white pine, above restocking size in other types = 1 M bd.ft. Pure stands of white pine under 6" DBH given normal value of \$25 per acre. Estimated normal per acre value of white pine restocking: degree of restocking; light = \$1, medium = \$2, heavy = \$3.

Stumpage prices under present abnormal conditions range from \$2 to \$6 per thous- and board feet. This is, however, a temporary situation which should return to normal when economic conditions improve.

Ribes Conditions

In over 80 per cent of the white pine area, the Ribes can be eradicated by scouting methods, because the bushes are few in number and usually occur in definite sites. In the other portions, the Ribes (principally prostratum and hirtellum) exist in fairly heavy concentrations. An average of 7 bushes per acre has been destroyed on a total of 2,775,327 acres worked during the period 1918 to 1932, inclusive.

Pine Infection Conditions

General in the commercial range of white pine - based on township units in this region, the percentage of diseased pine ranges from 1 to 10 per cent of the total amount of pine - most of the infection has originated since 1918, and is especially abundant in southwestern Maine, notably in Lincoln County - the oldest infection is located at Kittery Point, apparently originated in 1897 from cultivated black currants imported from England. A particularly heavy wave of infection occurred in unprotected areas during 1925.

ESTIMATE OF THE VALUE OF WHITE PINE

Amount and Commercial Value of White Pine

Category	Volume (cu ft)	Value (\$)
Pure white pine (80-100% pine) - (Over 6" dia)	2,110,000	1,110,000
Pure white pine (80-100% pine) - (Under 6" dia)	1,110,000	1,110,000
Mixed white pine (50-75% pine in mixture)	2,110,000	1,110,000
Mixed white pine (25-50% pine in mixture)	2,110,000	1,110,000
Other types with scattered white pine standing and restocking*	2,110,000	1,110,000
Total	10,550,000	5,550,000

*Excluded those "other types" which have 1-25% pine (above restocking size), but do not contain white pine restocking.

**This acreage not included in total as it is already listed under pure and mixed white pine types.

Notes for estimating value of white pine: merchantable stems are 10 ft. or more in diameter at base, pure merchantable white pine = 10 ft. dia. 1 ft.; mixed white pine, 25-50% = 4 ft. dia.; mixed white pine, 50-75% = 8 ft. dia.; and white pine, above restocking size in other types = 1 ft. dia. Pure stands of white pine under 6" TBA given normal value of \$25 per acre. Estimated normal per acre value of white pine restocking: degree of restocking: light = \$1, medium = \$2, heavy = \$3.

Strawberry prices under present abnormal conditions range from 15 to 25 per bushel and board feet. This is, however, a temporary situation which should return to normal when economic conditions improve.

Riparian Conditions

In over 80 per cent of the white pine area, the riparian can be eradicated by scientific methods. Because the riparian is few in number and usually occur in definite sites. In the other portions, the riparian (principally poplars and alders) exist in fairly heavy concentrations. An average of 7 bushes per acre has been destroyed on a total of 2,775,351 acres during the period 1914 to 1927, inclusive.

Pine Infection Conditions

General in the commercial ranges of white pine - based on available data in this region, the percentage of diseased pine ranges from 1 to 10 per cent of the total amount of pine - most of the infection has originated since 1918, and is especially abundant in southwestern Idaho, notably in Lincoln County - the oldest infection is located at Ketchikan, Alaska, apparently originated in 1907 from cultivated black conifers imported from England. A particularly heavy wave of infection occurred in unprotected areas during 1925.

Policy

Prior to 1931, the state cooperated with towns and individuals in Ribes eradication, by furnishing scouts to systematically examine town control areas to determine the Ribes concentrations, which were eradicated by individual owners, working under the supervision of town foremen paid from town funds. The Ribes concentrations covered only about 15 per cent of the control areas, consequently the Ribes on 85 per cent of the total acreage were eradicated by the scouts. However, the bushes pulled by these men represented less than one per cent of the total number destroyed. A new state policy was inaugurated in 1931 whereby the eradication work was performed on the township basis, as in New Hampshire, the state paying one-third of the total costs.

Informational and Service Activities of Permanent and Temporary Agents, 1923-1932

Informational

Meetings addressed.....	418	Publications distributed.....	64,327
Attendance.....	24,650	Mimeo.articles dist.(1928-1932).....	4,265
Field demonstration meetings.....	868	Items published.....	556
Attendance.....	4,989	Posters and signs placed.....	18,681
Displays placed.....	904	Roadside dem.placed (1930-1932).....	100

Service

Initial interviews.....	27,228	Persons instructed in field.....	19,632
Follow-up calls.....	9,015		

Town and Individual Cooperation in Blister Rust Control Work

Period	Number Town Appropriations	Town Money Expended	Number Individual Cooperators	Amount Expended by Individuals
1918-1921	0	0	30	\$ 1,163.07
1922-1932	486	\$85,088.44	11,059	81,984.02
Totals	486	\$85,088.44	11,089	\$83,147.09

The expenditures by individuals include \$977.12 spent on blister rust infection pruning work during 1932.

Results of Regular Cooperative Ribes Eradication Work, 1918-1932, Inclusive (Initial and Re-eradication)

Period	Acreage Worked	Ribes Pulled		Cost				Total	Per Acre Cost	Ribes
		Wild	Cult.	State	Towns	Indiv.	Govt.			
18-21	180,630	658,729	1,579	\$ 6,055.83		-\$ 1,163.07	\$12,489.24	\$ 19,708.14	.109	3.6
22-32	2,594,697	18,683,525	117,511	22,752.03	\$84,378.71	80,682.45	23,112.85	210,926.04	.081	7.2
Totals	2,775,327	19,342,254	119,090	\$28,807.86	\$84,378.71	\$81,845.52	\$35,602.09	\$230,634.18	.083	7.0

Excludes special nursery sanitation work during the period 1930-1932, inclusive,

Policy

From 1931, the state cooperated with towns and individuals in Ribes creation, by furnishing agents to systematically search town central areas to determine the Ribes concentrations, which were eradicated by individual owners, working under the supervision of town foremen paid from town funds. The Ribes concentrations covered only about 15 per cent of the control areas, consequently the Ribes of 25 per cent of the total acreage were eradicated by the agents. However, the houses pulled by these men represented less than one per cent of the total number destroyed. A new state policy was inaugurated in 1937 whereby the eradication work was performed on the township basis, as in New Mexico, the state paying one-third of the total costs.

Informational and Service Activities of Treatment and Prevention, 1931-1938

Informational

Meetings attended.....	118	Publications distributed.....	64,327
Attendance.....	24,670	Mass articles dist. (1932-1938).....	4,225
Field demonstration meetings.....	482	Items published.....	255
Attendance.....	4,939	Posters and signs placed.....	13,531
Displays placed.....	904	Modeling dem. placed (1930-1938).....	100

Service

Initial interviews.....	27,228	Persons instructed in field.....	19,635
Follow-up calls.....	9,015		

Town and Individual Cooperation in Ribes and Control Work

Period	Number Town Agents	Town Money Expended	Number Individual Cooperators	Amount Received by Individuals
1913-1931	0	0	30	\$ 1,157.07
1932-1938	432	\$32,038.44	11,079	\$1,334.05
Totals	432	\$32,038.44	11,109	\$2,491.12

The expenditures by individuals include \$97.25 spent on clearing and infection training work during 1932.

Results of Greater Cooperative Ribes Eradication Work, 1932-1938, Inclusive (Initial and Re-treatment)

Period	Area	Area	Area	Area	Area	Area	Area
1931	180,820	654,729	1,279,100	1,002,171	-	1,125,071	483,523
1932	2,254,607	18,525,117	22,742,037	24,378,711	20,032,411	27,112,110	20,032,411
1933	2,717,127	19,234,110	22,807,551	24,111,711	20,032,411	27,112,110	20,032,411

when a separate record was kept of this project.

The cost of the regular Ribes eradication project includes owners' labor (valued at 40 cents per hour) and ^{all expenditures} for wages of laborers, scouts, and foremen employed in locating and pulling Ribes.

Results of Ribes Eradication Work at Acadia National Park
(Not included in preceding eradication summaries)

Period	Acreage Worked (All initial erad.)	Ribes Pulled		Total Cost	Per Acre	
		Wild	Cult.		Cost	Ribes
1929-1932	7,726	503,920	0	\$11,491.36	\$1.49	65.2

This work at Acadia National Park has been conducted as a strictly Federal project by the National Park Service in cooperation with the Bureau of Plant Industry.

Results of First Re-eradication of Ribes, 1923-1932, Inclusive

Acreage Reworked	Ribes Pulled		Cost					Per Acre	
	Wild	Cult.	State	Towns	Indiv.	Govt.	Total	Cost	Ribes
37,993	539,188	1,517	\$2,374.36	\$2,329.99	\$5,733.49	\$591.20	\$11,029.04	2.90	14.2

No direct comparison is practicable between the per acre cost of the re-eradication work and the corresponding cost for all Ribes eradication, since there is a variation in the acreage involved and in the sites examined. The bulk of the re-eradication work has been in sites with Ribes concentrations where crew work was required.

Status of Regular Ribes Eradication Work - December, 1932

Total Acreage of Control Area	Acreage of Control Area Worked		Acreage of White Pine		Est. Acreage White Pine Protected		Est. per-centage Control Area Worked*		Acreage Still in Need of Protection	
	Initial Erad.	Re-erad.	Total in State	Total in Control Area	Initial Erad.	Re-erad.	Initial Erad.	Re-erad.	Initial Erad.	Re-erad.
4,121,271	2,745,060	37,993	2,608,911	1,781,062	1,185,866	16,417	66.6	0.9	1,376,211	4,083,278

*The percentages are the same for the pine area protected in the control area.

The "control area" is the sum of the acreage initially cleared of Ribes to date plus the estimated acreage still in need of initial protection. The latter figure was obtained by estimates made by the agents for each town within their districts. Outside the agents' districts the acreage still in need of protection was estimated by the Boston Office as being the acreage of the pure and mixed (30-79%) white pine plus an additional acreage for protection zones equivalent to 30 per cent of this pine area.

When a separate record was kept of this project.

The cost of the various types of protection project included salaries, labor (wages at 40 cents per hour) and for fees of laborers, scouts, and foremen employed in locating and setting traps.

Results of River Protection Work at Acadia National Park (not included in preceding eradication summaries)

Period	Average Per Cent (All Initial erad.)	Rivers Killed		Total Cost	Per Acre Cost
		Wild	Cult.		
1929-1932	7.75%	207,920	0	\$11,401.36	\$1.47

This work at Acadia National Park has been conducted as a strictly Federal project by the National Park Service in cooperation with the Bureau of Plant Industry.

Results of First River Protection of River, 1927-1932, Inclusive

Average Per Cent	Rivers Killed		State	County	Initial	Govt.	Total	Per Acre Cost
	Wild	Cult.						
37.5%	839,128	1,217	\$2,774.36	\$2,329,225.73	\$4,103,001.09	\$9,075.20	\$1.45	

No direct comparison is practicable between the per acre cost of the eradication work and the corresponding cost for all River eradication, since there is a variation in the acreage involved and in the sites examined. The bulk of the eradication work has been in sites with River concentrations where work was required.

Status of Regular River Protection Work - December, 1932

Total Control Area	Worked	Average of Control Area	Control Area	Worked	Average of Control Area	Control Area	Worked	Average of Control Area
Initial Per Cent	Initial Per Cent	Initial Per Cent	Initial Per Cent	Initial Per Cent	Initial Per Cent	Initial Per Cent	Initial Per Cent	Initial Per Cent
Govt. Per Cent	Govt. Per Cent	Govt. Per Cent	Govt. Per Cent	Govt. Per Cent	Govt. Per Cent	Govt. Per Cent	Govt. Per Cent	Govt. Per Cent
Total Per Cent	Total Per Cent	Total Per Cent	Total Per Cent	Total Per Cent	Total Per Cent	Total Per Cent	Total Per Cent	Total Per Cent

*The percentages are the same for the area protected in the control area.

The "control area" is the area of the average initially cleared of River to date. The area cleared is still in need of initial protection. The latter figure was obtained by estimating the area for each town within their limits. The area cleared by the State is still in need of protection and estimated by the State Office as being the average of the area and cleared (30-75%) while the area an additional acreage for protection amounting to 30 per cent of this area.

The pine acreage in the control area was estimated to be the total pine area within the agents' districts and the acreage of pure and mixed (30-79%) white pine outside the agents' districts. The acreage of pine protected therefore amounts to the same proportion of the total pine area in the agents' districts as that percentage of the total control area in their districts that has been initially cleared of Ribes.

Nursery Sanitation

Status of Nursery Sanitation Work - December, 1932

	Number of Nurseries Growing White Pine				Number Protected from Blister Rust			
	Reforestation Only	Ornamental Only	Both	Total	Reforestation Only	Ornamental Only	Both	Total
Commercial nurseries	1	3	5	9	1	1	3	5
State nursery	1	-	-	1	1	-	-	1
Total	2	3	5	10	2	1	3	6

The two unprotected nurseries, growing white pine for reforestation and ornamental purposes, are no longer of importance from a control viewpoint. The one at Skowhegan is going out of business and the planting stock is too large for reforestation; while the other, located at Cupsuptic and owned by the Brown Company, is discontinuing the growing of white pine at this nursery due to the difficulty of maintaining Ribes-free conditions in the environs. The existing stock in this latter nursery will be planted locally on lands owned by the Company. During 1929, the Western Maine Forest Nursery at Fryeburg was granted a pine shipping permit under Federal Quarantine 63. This permit was revoked in 1931, but it is expected that this nursery will again qualify in 1933. The Bates Forest nursery has also applied for a pine-shipping permit, and an inspection will be made of this nursery and its environs during the spring of 1933.

Ribes Eradication Work in Connection with Nursery Sanitation Project, 1930-1932, Inclusive

Type of Work	Acreage Worked	Ribes Pulled		Total Cost	Per Acre	
		Wild	Cult.		Cost	Ribes
Initial eradication	206	103,516	22	\$522.65	\$2.54	502.5
Re-eradication	30	211	-	11.60	.387	7.0
Total	236	103,727	22	\$534.25	\$2.26	439.5

Since 1930, a separate record has been kept of all nursery sanitation work and these data have not been included in the regular eradication summary. Prior to 1930, it was not possible to separate these data from the available records. However, an incomplete summary supplied by the state leader shows that in connection with such work

1011-1012, 1013, 1014, 1015

ST-1 - no record - not listed - not in file

For the unexcused absence, moving with the line for reforestation and other
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Since 1950, a separate record has been kept of all necessary consultation work and these data have not been included in the regular radiation summary. From 1950, it was not possible to separate these data from the available records. However, an incomplete survey carried out by the state inspector shows that in connection with work

during the period 1925-1929, inclusive, a total of 815 acres was cleared of 92,912 wild Ribes at a cost of \$702.10. Of this total, 400 acres were re-eradication work in which 1,343 wild Ribes were removed at a cost of \$85.00.

Black Currant Eradication

The control policy in Maine requires the destruction of all cultivated Ribes in white pine areas. Therefore, black currants are eradicated in connection with the regular town control projects. It will, however, be necessary to make special arrangements for eliminating Ribes nigrum outside the agent districts. Many Ribes americanum are cultivated in Maine, but apparently few Ribes nigrum.

Cultivated Ribes Compensation

No compensation has been paid for the 119,112 cultivated Ribes that have been uprooted in Maine during the period 1918-1932, inclusive.

Surveys

During 1920 and 1921, the white pine types were mapped in several towns in Maine - Briscoe had maps and a report prepared of this work - maps used as a basis for control work and as an estimate of pine values. Strip line infection survey made by Frost in 1920 - the pines on rod wide strips totaling 38.5 miles in length were examined - a total of 7,046 pines were inspected, and 6.3 per cent were found infected - 11 plots, totaling 2.7 acres, were laid out adjacent to the strips, 14.4 per cent of the 970 pines in these plots were diseased - data used for informational purposes. Epidemiology survey made during 1926, by agents and Hirt, of white pine and other forest types, Ribes and infection conditions - maps and summaries prepared at Boston Office.

Investigations

Demonstration control areas at Kittery Point and Brunswick - very little data on these studies available. Infection and effectiveness of control study made by Posey at Kittery Point - report published. Many pine damage plots laid out by agents - used for demonstration purposes - infection data summarized and used by agents in informational work. Effectiveness of control studies made by agents during 1929. These data were summarized at the Boston Office, and copies of the summaries sent to the state leader and Washington Office. Four of the Maine agents, including the state leader, are cooperating in the study to determine the immunity of the Viking currant to blister rust infection.

Total Cost of All Blister Rust Control Work, 1918-1932, Inclusive

State Blister Rust Appropriation Funds	Other State Appropriation Funds	Individual Funds or Labor	Town Funds	Federal \$ for \$ Expenditures	Total
\$83,581.75	\$9,205.20	\$83,147.09	\$85,088.44	\$229,732.58	\$490,755.06

During the period 1937-1939, inclusive, a total of 215 acres was planted at \$2,315 with 1500 lbs of seed at a cost of \$100.10. Of this total, 1000 acres were re-plantation work in which 1,745 lbs of seed were planted at a cost of \$125.00.

Black Forest Plantation

The control policy in this plantation is the destruction of all cultivated trees in white pine areas. Therefore, black spruce are eradicated in connection with the regular town control projects. It will, however, be necessary to make special arrangements for eliminating black spruce within the open districts. Any black spruce which are cultivated in white, but apparently less than 1000.

Cultivated Pine Plantation

No compensation has been paid for the 110,112 cultivated black spruce that have been planted in white during the period 1915-1922, inclusive.

Summary

During 1920 and 1921, the white pine trees were planted in several towns in Idaho - Grange and more and a report prepared of this work - now used as a basis for control work and as an estimate of the value. This line infection survey made by forest in 1920 - the lines on red white spruce totaling 30.5 miles in length were examined - a total of 7,045 lines were inspected, and 0.3 per cent were found infected - 11 plots, totaling 2.7 acres, were left out adjacent to the other, 14.4 per cent of the 270 miles in these plots were examined - data used for informational purposes. Epidemiology survey made during 1920, by agents and staff, at white pine and other forest types, lines and infection conditions - made and summaries prepared at Weston Office.

Investigation

Demographic control areas at Kittery Point and Brunswick - very little data on these studies available. Infection and effectiveness of control study made by forest at Kittery Point - report published. Many pine damage plots laid out by agents - used for demonstration purposes - infection data summarized and used by agents in future - financial work. Effectiveness of control studies made by agents during 1929. These data were summarized at the Weston Office, and copies of the summaries sent to the State Forester and Washington Office. Part of the same agents, including the State Forester, are cooperating in the study to determine the immunity of the living spruce to white pine bark infection.

Total Cost of All White Pine Control Work, 1915-1922, Inclusive

State Forest Plantation	Other State Approved Plantation	Inclusive of State Plantation	Cost of State Plantation	Total for State Plantation
117,251.75	10,205.00	127,456.75	127,038.44	127,038.44

This summary does not include \$16,957.99 expended by National Park Service and Bureau of Plant Industry on control project at Acadia National Park.

The total expenditures for all control work include cost of administration, supervision, blister rust control agent activities, Ribes eradication, field investigations, nursery sanitation, and miscellaneous.

Relation of Total Cost of All Control Activities to Total Commercial Value of White Pine

Acreage of White Pine	Commercial Value of White Pine	Total Cost of All Control Activities, 1918-1932, Incl.*	Per Cent of Total Commercial Value Represented by Cost of All control Work
2,608,911	\$102,109,599.	\$507,713.05	0.5

*Includes expenditures at Acadia National Park.

Comparison Between Cost Per Acre Based on Eradication Costs Only and on Cost of All Control Projects, 1918-1932, Inclusive

(Not including Acadia National Park Project)

Ribes Per Acre	Cost Per Acre							
	Based on Ribes Eradication Costs Only				Based on Total Expenditures			
	1918-1932		Average Per Year		1918-1932		Average Per Year	
	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected
7.0	.083	.192	.006	.013	.177	.408	.012	.027

Future Work

Complete initial control work on 1,376,211 acres including protection of pure and mixed (30-79%) pine outside present agent districts (Basis: estimates made by agents of acreage still needing initial eradication in each town in their district; in section outside districts, estimate based on acreage of pure and mixed (30-79%) pine plus an additional 30 per cent for protection zones. Re-examination of control areas which have not been re-eradicated, 4,083,278 acres; estimate 50 per cent or 2,041,639 acres will need intensive reworking.

This summary does not include the \$1,000,000 expended by the National Park Service and Bureau of Plant Industry on control project at Acadia National Park.

The total expenditures for all control work include cost of administration, supervision, disaster relief control agent activities, fire eradication, field investigation, survey, sanitation, and miscellaneous.

Relation of Total Cost of All Control Activities to Total Commercial Value of White Pine

Acres of White Pine	Commercial Value of White Pine	Total Cost of All Control Activities, 1918-1922, Incl.*	The Cost of Total Commercial Value Represented by Cost of All Control to
2,608,211	\$102,109,509	\$107,113.07	0.5

*Includes expenditures at Acadia National Park.

Comparison between Cost per Acre Based on Eradication Costs Only and on Cost of All Control Projects, 1918-1922, Inclusive (Not Including Acadia National Park Project)

Line	Based on Eradication Costs Only		Based on Total Expenditures	
	1918-1922	Average per Year	1918-1922	Average per Year
Line	Total Area Line	Total Area Line	Total Area Line	Total Area Line
Line	Protected	Worked	Protected	Worked
1	1.32	.006	.015	.111
2	.087	.002	.005	.012
3	.027			

Future Work

Complete initial control work on 1,875,211 acres including protection of pure white pine (1918-1922) line outside present agent districts (areas: estimates made by agents on average 2000 feet initial eradication in each town in their district; in section outside districts, estimates based on records of 1918-1922) line and 1918-1922 line. Re-estimation of control areas which have not been re-estimated, \$1,000,000 cost; estimate for cost of \$1,000,000 cost will need intensive recording.

General in commercial pine range, especially severe in northern Connecticut River Valley region. Based on township units, the percentage of diseased pine ranges from 1 to 30 per cent of the total amount of pine. Also see strip line data given

WHITE PINE CONDITION IN THE MOUNTAINS

Forests and Commercial Value of White Pine

Value	Acres	
289,214.312	507,222	Pure white pine (80-100% pure) - (Over 5" DBH).....
17,707,022	442,222	..... (Under 5" DBH).....
8,200,222	200,410	Mixed white pine (71-82% pure in mixture).....
12,888,400	270,300	..... (30-70% pure in mixture).....
		Other types with scattered white pine stocking and restocking.....
1,100,000 - 1,100,000	121,411	.....
1,100,000 - 1,100,000		White pine restocking in pure merchantable and mixed white pine types.....
412,832	239,081**	.....
100,212,102	1,244,033	Total.....

*Includes those "other types" which have 1-30% pine (above restocking size), but do not contain white pine restocking.

**This acreage not included in total as it is already listed under pure and mixed white pine types.

Notes for estimating value of white pine: merchantable stumpage figured at normal value of \$7 per M - average volume per acre, pure merchantable white pine = 10 bd.ft.; mixed white pine, 51-52% = 4 M bd.ft.; mixed white pine, 70-72% = 3 M bd.ft.; and white pine, above restocking size in other types = 1 M bd.ft. The value of white pine under 5" DBH given normal value of \$25 per acre. Estimated normal per acre value of white pine restocking: degree of restocking, light = \$1.00, medium = \$2.00, heavy = \$3.00.

Stumpage prices under present abnormal conditions range from \$2.00 to \$6.00 per thousand board feet. This is, however, a temporary situation which should return to normal when economic conditions improve.

Riparian Conditions

Riparian areas are generally distributed throughout the state being most abundant in the central, west central and northern portions. An average of 11.9 bushes per acre have been destroyed on the 3,002,342 acres cleared of riparian forest during the period 1911-1912, inclusive. In the northern part of the state, there are very few areas where the bushes are so few and localized that they can be effectively eradicated by axwork.

Pine Infection Conditions

General in commercial pine ranges, especially severe in northern Connecticut River Valley region. Based on township units, the percentage of diseased pine ranges from 1 to 50 per cent of the total amount of pine. Also see strip line data given

under "Blister Rust Surveys". Two especially heavy infection areas were located in unprotected tracts during the spring of 1929; one in the vicinity of Moose Mountain in the town of Hanover, and the other along the upper waters of Underwood Brook, situated in the northeastern part of Acworth. Both of these infection areas cover a large territory. An acre plot, examined in the Acworth area, showed that 94 out of every 100 trees were fatally infected with the disease. In many instances, the pines had been so seriously infected that every branch contained several cankers. Several new areas of heavy pine infection were located during 1931 and 1932, especially impressive ones being found in the towns of Gilmanton and Landaff.

Policy

The state cooperates primarily with towns, paying 20 per cent of the total costs of the town projects. The control work is performed by state crews (paid from state and town funds) working systematically definite town blocks irrespective of property lines. Some cooperation is also obtained from individual owners. The state assists such persons by paying 20 per cent of the costs of control work. Because many of the backward towns had not cooperated, the state legislature passed a law in 1929 requiring towns to appropriate for blister rust control, amounts not to exceed \$400 in any one year, provided the state forester and the governor and his council demanded such action. Compulsory measures were applied for the first time in 40 towns during 1930. In 1931, the state law was applied in 30 towns which did not cooperate and in 10 additional towns where small voluntary appropriations were made. Due to economic conditions, this state law was not enforced during 1932.

Informational and Service Activities of Permanent and Temporary Agents (1923-1932)

Informational

Meetings addressed.....	1,714	Publications distributed.....	175,073
Attendance.....	107,393	Mimeo.articles dist.(1928-1932)..	61,691
Field demonstration meetings.....	721	Items published.....	3,425
Attendance.....	7,973	Posters and signs placed.....	19,670
Displays placed.....	1,694	Roadside dem.placed (1930-1932)..	27

Service

Initial interviews.....	24,839	Persons instructed in field.....	15,577
Follow-up-calls.....	21,206		

Town and Individual Cooperation in Blister Rust Control Work

Period	No. Town Appropriations	Town Money Expended	No. Individual Cooperators	Expenditures by Individuals
1918-1921	162	\$ 25,056.35	142	\$ 8,097.56
1922-1932	929	323,291.92	532	38,540.13
Totals	1,091	\$348,348.27	674	\$46,637.69

In addition, \$42.86 was expended by 4 individual cooperators in 1917.

was being found in the towns of Wilmington and Maryland. Trees of heavy pine infection were located during 1931 and 1932, especially in the area of heavy pine infection that every branch contained several new cones. In many instances, the pines had been fatally infected with the disease. In some plots, examined in the Adams Co. area, showed that 91 out of every 100 trees were fatally infected with the disease. In the northeastern part of Adams Co. Both of these infection areas cover a large part of Adams Co., and the other being the upper waters of Unadilla River, situated on the town of Adams Co., and the other being the upper waters of Unadilla River, situated on the town of Adams Co. The infection areas were located in the vicinity of Adams Mountain in Adams Co. (See also "Adams Co. Survey"). The area being surveyed was located in Adams Co.

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The state cooperated primarily with towns, paying 50 per cent of the total cost of the town projects. The control work is performed by state crews (paid from state funds), working systematically definite town blocks irrespective of property lines. Some cooperation is also obtained from individual owners. The state assists each person by paying 50 per cent of the costs of control work. Because work on the unimproved towns had not cooperated, the state legislature passed a law in 1929 requiring owners to register for blaster and control. Amounts not to exceed \$400 in any one year, provided the state forester and the Governor and his council approved such action. The law was applied for the first time in 1930 during 1930. In 1931, the state law was applied in 70 towns which did not cooperate and in 10 additional towns where small voluntary organizations were made. Due to economic conditions, this state law was not enforced during 1932.

Information and service activities of treatment and therapy groups are intended to solidify values and self-direction
(1501-1501)

	.....	21,806	Misses called.....
	.....	24,339	Misses interviewed.....
Persons instructed in field.....	15,577		
<u>Service</u>			
	.....	1,694	Large place.....
	.....	7,973	Attendance.....
	.....	701	Sold demonstration meetings.....
Items published.....	1,475		
Mimeographed articles dist.(1933-1935).....	21,641		
Publications distributed.....	172,073		
<u>Informational</u>			

born and Individual Cooperation in Elitist Hunt Control

Admission No. of Individuals	Admission No. of Individuals	Admission No. of Individuals	Admission No. of Individuals
100.00	100.00	100.00	100.00
100.00	100.00	100.00	100.00
100.00	100.00	100.00	100.00

in addition, 10.5% were recorded by # individual observers in 1977.

Results of Regular Cooperative Ribes Eradication Work, 1918-1932, Inclusive
(Initial and Re-eradication)

Period	Acreage Worked	Ribes Pulled		Cost					Per Acre	
		Wild	Cult.	State	Towns	Indiv.	Govt.	Total	Cost	Ribes
1918-21	570,905	6,335,690	61,517	\$ 28,601.63	\$ 25,056.35	\$ 8,097.56	\$59,385.00	\$121,140.54	\$.212	11.1
1922-32	22,451,943	29,706,819	82,458	100,985.80	322,443.98	38,387.05	360.56	462,177.39	.188	12.1
Totals	3,022,848	36,042,509	143,975	\$129,587.43	347,500.33	46,484.61	59,745.56	583,317.93	.193	11.9

This summary includes 395 acres cleared of 39,937 wild Ribes on the White Mountain National Forest during 1931 at a cost of \$360.56 to the Government and \$90.14 to the state. This work was performed under the supervision of state men and included in the regular eradication summary for that year.

Excludes special nursery sanitation work during the period 1930-1932, inclusive, when a separate record was kept of this project.

The cost of the regular Ribes eradication project covers all expenditures for wages of laborers, linemen, scouts, and foremen employed in locating and pulling Ribes.

Additional Ribes Eradication Work on White Mountain National Forest
(1924-1927)

Acreage Worked	Ribes Pulled		Total Federal Cost	Per Acre	
	Wild	Cult.		Cost	Ribes
6,384	142,556	0	\$1,320.66*	\$.207	22.3

*The State of New Hampshire paid \$133.97 of this cost.

Results of First Re-eradication of Ribes, 1923-1932, Inclusive

Acreage Reworked	Ribes Pulled		Cost				Per Acre	
	Wild	Cult.	State	Towns	Indiv.	Total	Cost	Ribes
362,210	1,720,564	3,366	\$9,299.34	\$29,532.47	\$5,322.24	\$44,154.05	\$.122	4.8

This re-eradication work in New Hampshire represents 41.4 per cent of all such work that has been performed to date in the Northeastern States. No satisfactory direct comparison can be made between the per acre cost of the re-eradication work and the per acre cost of all Ribes eradication since there is a variation in the acreage involved and in the Ribes sites examined. However, the data shows that the re-eradication work has cost on the average 12.2 cents per acre whereas the cost of the initial work during the period 1918-1932, inclusive, averaged 20.3 cents per acre.

Results of River Re-Stationing Work, 1918-1932, Inclusive
(Initial and Re-stationing)

Station	River Miles	Cost				Total	Cost
		State	Local	Private	Govt.		
1-20	1.00	100.00	0.00	0.00	0.00	100.00	100.00
2-100	1.00	100.00	0.00	0.00	0.00	100.00	100.00
101-200	1.00	100.00	0.00	0.00	0.00	100.00	100.00
201-300	1.00	100.00	0.00	0.00	0.00	100.00	100.00
301-400	1.00	100.00	0.00	0.00	0.00	100.00	100.00
401-500	1.00	100.00	0.00	0.00	0.00	100.00	100.00
501-600	1.00	100.00	0.00	0.00	0.00	100.00	100.00
601-700	1.00	100.00	0.00	0.00	0.00	100.00	100.00
701-800	1.00	100.00	0.00	0.00	0.00	100.00	100.00
801-900	1.00	100.00	0.00	0.00	0.00	100.00	100.00
901-1000	1.00	100.00	0.00	0.00	0.00	100.00	100.00
Total	10.00	1000.00	0.00	0.00	0.00	1000.00	1000.00

This summary includes 325 acres cleared of 19,937 wild fiber on the White Mountain National Forest during 1921 at a cost of \$360.00 to the Government and \$90.14 to the state. This work was performed under the supervision of state men and included in the regular re-stationing work for that year.

Extensive special survey, sanitation work during the period 1930-1932, inclusive, when a separate record was kept of this project.

The cost of the regular fiber re-stationing project covers all expenditures for wages of laborers, timber, tools, and for men employed in locating and cutting fiber.

Summary of River Re-Stationing Work on White Mountain National Forest
(1918-1932)

Station	River Miles	Cost				Total	Cost
		State	Local	Private	Govt.		
1-20	1.00	100.00	0.00	0.00	0.00	100.00	100.00
2-100	1.00	100.00	0.00	0.00	0.00	100.00	100.00
101-200	1.00	100.00	0.00	0.00	0.00	100.00	100.00
201-300	1.00	100.00	0.00	0.00	0.00	100.00	100.00
301-400	1.00	100.00	0.00	0.00	0.00	100.00	100.00
401-500	1.00	100.00	0.00	0.00	0.00	100.00	100.00
501-600	1.00	100.00	0.00	0.00	0.00	100.00	100.00
601-700	1.00	100.00	0.00	0.00	0.00	100.00	100.00
701-800	1.00	100.00	0.00	0.00	0.00	100.00	100.00
801-900	1.00	100.00	0.00	0.00	0.00	100.00	100.00
901-1000	1.00	100.00	0.00	0.00	0.00	100.00	100.00
Total	10.00	1000.00	0.00	0.00	0.00	1000.00	1000.00

*The State of New Hampshire paid \$11.97 of this cost.

Results of River Re-Stationing of Fiber, 1933-1935, Inclusive

Station	River Miles	Cost				Total	Cost
		State	Local	Private	Govt.		
1-20	1.00	100.00	0.00	0.00	0.00	100.00	100.00
2-100	1.00	100.00	0.00	0.00	0.00	100.00	100.00
101-200	1.00	100.00	0.00	0.00	0.00	100.00	100.00
201-300	1.00	100.00	0.00	0.00	0.00	100.00	100.00
301-400	1.00	100.00	0.00	0.00	0.00	100.00	100.00
401-500	1.00	100.00	0.00	0.00	0.00	100.00	100.00
501-600	1.00	100.00	0.00	0.00	0.00	100.00	100.00
601-700	1.00	100.00	0.00	0.00	0.00	100.00	100.00
701-800	1.00	100.00	0.00	0.00	0.00	100.00	100.00
801-900	1.00	100.00	0.00	0.00	0.00	100.00	100.00
901-1000	1.00	100.00	0.00	0.00	0.00	100.00	100.00
Total	10.00	1000.00	0.00	0.00	0.00	1000.00	1000.00

This re-stationing work in New Hampshire represents 41.7 per cent of all such work that has been performed to date in the White Mountain Forest. No satisfactory direct comparison can be made between the per cent cost of the re-stationing work and the per cent cost of all fiber re-stationing since there is a variation in the average re-stationing and in the fiber fiber removed. However, the data shows that the re-stationing work has cost on the average 12.8 cents per acre whereas the cost of the initial work during the period 1918-1932, inclusive, averaged 50.3 cents per acre.

Status of Regular Ribes Eradication Work - December, 1932

Total Acreage of Control Area	Acreage of Control Area Worked		Acreage of White Pine		Est. Acreage White Pine Protected		Est. Percent- age Control Area Worked*		Acreage Still in Need of Protection	
	Initial Erad.	Re-erad.	Total in State	Total in Control Area	Initial Erad.	Re-erad.	Ini-tial	Re-erad.	Initial Erad.	Re-erad.
3,179,508	2,667,022	362,210	1,544,033	1,544,033	1,296,173	176,034	83.9	11.4	512,486	2,817,298

*The percentages are the same for the pine area protected in the control area.

The "control area" is the sum of the acreage already cleared of Ribes plus the acreage still in need of initial protection. The latter figure was compiled from estimates made by the agents of the acreage still remaining to be done in each town in their district. The control area includes the total pine area of the state.

Nursery Sanitation

Status of Nursery Sanitation Work - December, 1932

	Number White Pine Growing Nurseries				Number Protected From Blister Rust			
	Reforestation Only	Ornamental Only	Both	Total	Reforestation Only	Ornamental Only	Both	Total
Commercial nurseries	-	2	2	4	-	2	2	4
State nursery	1	-	-	1	1	-	-	1
Total	1	2	2	5	1	2	2	5

All the white pine growing nurseries in the state have been examined for Ribes. The state nursery at Gerrish, the Keene Forestry Association Nursery at Keene, and the Fryeburg Nursery at Conway have been conducting initial and re-eradication work around their properties for years. In spite of this, considerable pine infection was found during 1928 in the Keene Nursery, where a difficult skunk currant situation exists. As a result, this nursery destroyed 30,000 white pine transplants and also arranged for a reinspection of the nursery and its environs for Ribes. A single pine infection was also discovered at the state nursery during 1928. An examination of the environs of this nursery during the fall of 1932 resulted in the location of several Ribes - necessary re-eradication work is planned for 1933.

Results of Ribes Eradication Work in Connection with Nursery Sanitation Project (1930-1932)

Acreage Worked (All re-eradication)	Ribes Pulled		Total Cost	Per Acre	
	Wild	Cult.		Cost	Ribes
646	7,345	0	\$201.44	\$.312	11.4

[illegible]

The "control area" is the sum of the acreage already cleared of riparian vegetation and the acreage still requiring to be done in each town in the district. The control area includes the total pine area of the state.

NOTES

Statement of _____
dated _____

	Total	State	Federal	Private	Commercial
Land	1	-	1	-	-
Water	1	-	1	-	-
Forest	1	-	1	-	-
Pasture	1	-	1	-	-
Cropland	1	-	1	-	-
Barren	1	-	1	-	-
Other	1	-	1	-	-
Total	6	0	6	0	0

Several Bibles - necessary re-identification was obtained for 1937.

Since 1930, a separate record has been kept of the nursery sanitation work and these data have not been included in the regular eradication summaries. An incomplete summary supplied by the state leader for the period 1925-1929, inclusive, shows that 1,566 acres were cleared of 10,725 wild and 45 cultivated Ribes at a total cost of \$625.62. Of this total, 1,451 acres were re-eradication work, 10,696 wild and 45 cultivated bushes being eradicated at a cost of \$609.06. No data are available for any of the work performed prior to 1925.

Black Currant Eradication

The town control policy in New Hampshire systematically eliminates cultivated Ribes from all white pine regions; therefore, no special general campaign is needed to eradicate black currants. Most of the initial eradication work has been completed in the section of the state where the greater portion of black currants existed.

Cultivated Ribes Compensation, 1918-1932

Total number of cultivated bushes destroyed.....	143,975
Number of bushes for which compensation was paid.....	2,008
Number of persons paid compensation.....	63
Amount paid in reimbursement.....	\$550.60

Surveys

Because of the general distribution of white pine, a special mapping of such areas is not necessary, especially as the epidemiology study gave town information on white pine and other forest types, Ribes, and infection conditions. During 1919, detailed forest type maps were made of the towns of Dover and Kensington - this work developed effective methods of mapping and estimating, and the data were used also for control work and informational purposes. In 1924, the State Forestry Department completed a forest resource survey, which showed 50 per cent of the wood products in New Hampshire were made of white pine. The annual cut of this species varies from 55 to 65 per cent of the total lumber cut in the state. Strip line infection surveys were made in 1920 - the pines on rod wide strips, totaling 54.5 miles in length, were examined - a total of 9,919 pines were inspected, and 13 per cent were found infected - 213 plots, totaling 49.1 acres, were laid out adjacent to the strips; 51.5 per cent of the 7,014 pines in these plots were diseased. During 1928, a survey was made in 69 backward towns to locate and map the minimum control area, which should be cleared of Ribes to protect the pine. Partly as a result of the facts obtained by this survey, over 30 per cent of these towns appropriated for control work in 1929. Similar work was conducted in other towns during 1931 and 1932. It resulted in complete data being secured, by township units, on the remaining acreage still needing initial protection.

Investigations

Demonstration control areas established at Conway and Wolfeboro - latter area rechecked during 1927 - detailed infection studies made by Endersbee at Hooksett, Hampstead, Sunapee, and Littleton - (reports submitted); by Posey, at Deerfield and Lisbon - (no report); by Richards, at Temple - (preliminary report only). Many damage and demonstration plots laid out by agents - used for informational purposes. Ribes

regrowth study made by Newman at Newmarket - (no report submitted). During 1929, effectiveness of control studies were made by the agents in 34 New Hampshire towns. These data were summarized at the Boston Office, and copies of the summaries sent to the state leader and Washington Office to be used for informational purposes. Chemical eradication study plots have been established in Swain's district. Five of the New Hampshire agents are cooperating in the study to determine the immunity of the Viking currant to blister rust infection.

Total Cost of All Blister Rust Control Work, 1918-1932, Inclusive

State Blister Rust Appropriation Funds	Individual Funds or Labor	Town Funds	Federal \$ For \$ Expenditures	Total
\$232,438.80	\$46,637.69	\$348,348.27	\$417,604.42	\$1,045,029.18

In addition, the U.S. Forest Service and the Bureau of Plant Industry spent \$2,497.83 on control work at the White Mountain National Forest.

The total expenditures for all control work include cost of administration, supervision, blister rust control agent activities, Ribes eradication checkers, field investigations, nursery sanitation, Ribes compensation, and miscellaneous.

Relation of Total Cost of All Control Activities to Total Commercial Value of White Pine

Acreage of White Pine	Commercial Value of White Pine	Total Cost of All Control Activities 1918-1932*	Per Cent of Total Commercial Value Represented by Cost of All Control Work
1,544,033	\$68,919,198.	\$1,047,527.01	1.5

*Includes cost of work on White Mountain National Forest.

Comparison of Cost Per Acre Based on Ribes Eradication Costs Only and on Cost of All Control Projects, 1918-1932, Inclusive
(White Mountain National Forest Project Not Included)

Ribes Per Acre	Cost Per Acre							
	Based on Ribes Eradication Costs Only				Based on Total Expenditures			
	1918-1932		Ave. Per Year		1918-1932		Ave. Per Year	
	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected
11.9	.193	.396	.013	.026	.346	.710	.023	.047

Future Work

Complete initial Ribes eradication 512,486 acres, (basis: revised estimates in 1932 by agents of total acreage to be worked in each town - including both pine areas and protection strips) - Re-examination of initial control areas that have not already been reworked, 2,817,298 acres; estimate 50 per cent, or 1,408,649 acres, will need to be reworked by crew methods.

regarding study and by Forest at Washington - (see report submitted, January 1952).
 effectiveness of control studies were made by the Forest in the same manner.
 These data were submitted to the Western Office, and copies of the summary sent to
 the State Division and Washington Office to be used for informational purposes. (The
 evaluation study has been submitted in detail to the State Division. Five of the
 Western Office are being used in the study to determine the amount of the study
 cost to be allocated.

Total Cost of All Winter Fuel Control Work, 1945-1952, Inclusive

State Office Fuel Administration Funds	Industrial Funds or Labor	Forest Funds	Federal & State Expenditures	Total
\$23,457.00	\$45,637.00	\$318,744.27	\$117,600.00	\$1,044,000.00

In addition, the U.S. Forest Service and the Bureau of Plant Industry spent
 \$2,475.83 on control work at the White Mountain National Forest.

The total expenditures for all control work include cost of administration,
 supervision, winter fuel control agent activities, fire protection measures, field
 investigations, survey equipment, fire suppression, and miscellaneous.

Relation of Total Cost of All Control Activities to Total Commercial Value of the Area

Amount of Total Value	Commercial Value of Total Area	Total Cost of All Control Activities 1945-1952*	Per Cent of Total Commercial Value Controlled by Forest Service
\$1,544,000	\$1,544,000	\$1,044,000.00	67.7%

*Includes cost of work on White Mountain National Forest.

Comparison of Cost for Fire Protection on Siskiyou National Forest and in Cost of All Control Projects, 1945-1952, Inclusive (White Mountain National Forest Project Not Included)

Year	Control Projects	Fire Protection	Forest Funds	State Funds	Federal Funds	Total
1945-1952	1.00	1.00	1.00	1.00	1.00	5.00
1953-1954	1.00	1.00	1.00	1.00	1.00	5.00
1955-1956	1.00	1.00	1.00	1.00	1.00	5.00
1957-1958	1.00	1.00	1.00	1.00	1.00	5.00
1959-1960	1.00	1.00	1.00	1.00	1.00	5.00
1961-1962	1.00	1.00	1.00	1.00	1.00	5.00
1963-1964	1.00	1.00	1.00	1.00	1.00	5.00
1965-1966	1.00	1.00	1.00	1.00	1.00	5.00
1967-1968	1.00	1.00	1.00	1.00	1.00	5.00
1969-1970	1.00	1.00	1.00	1.00	1.00	5.00
1971-1972	1.00	1.00	1.00	1.00	1.00	5.00
1973-1974	1.00	1.00	1.00	1.00	1.00	5.00
1975-1976	1.00	1.00	1.00	1.00	1.00	5.00
1977-1978	1.00	1.00	1.00	1.00	1.00	5.00
1979-1980	1.00	1.00	1.00	1.00	1.00	5.00
1981-1982	1.00	1.00	1.00	1.00	1.00	5.00
1983-1984	1.00	1.00	1.00	1.00	1.00	5.00
1985-1986	1.00	1.00	1.00	1.00	1.00	5.00
1987-1988	1.00	1.00	1.00	1.00	1.00	5.00
1989-1990	1.00	1.00	1.00	1.00	1.00	5.00
1991-1992	1.00	1.00	1.00	1.00	1.00	5.00
1993-1994	1.00	1.00	1.00	1.00	1.00	5.00
1995-1996	1.00	1.00	1.00	1.00	1.00	5.00
1997-1998	1.00	1.00	1.00	1.00	1.00	5.00
1999-2000	1.00	1.00	1.00	1.00	1.00	5.00
2001-2002	1.00	1.00	1.00	1.00	1.00	5.00
2003-2004	1.00	1.00	1.00	1.00	1.00	5.00
2005-2006	1.00	1.00	1.00	1.00	1.00	5.00
2007-2008	1.00	1.00	1.00	1.00	1.00	5.00
2009-2010	1.00	1.00	1.00	1.00	1.00	5.00
2011-2012	1.00	1.00	1.00	1.00	1.00	5.00
2013-2014	1.00	1.00	1.00	1.00	1.00	5.00
2015-2016	1.00	1.00	1.00	1.00	1.00	5.00
2017-2018	1.00	1.00	1.00	1.00	1.00	5.00
2019-2020	1.00	1.00	1.00	1.00	1.00	5.00
2021-2022	1.00	1.00	1.00	1.00	1.00	5.00
2023-2024	1.00	1.00	1.00	1.00	1.00	5.00
2025-2026	1.00	1.00	1.00	1.00	1.00	5.00
2027-2028	1.00	1.00	1.00	1.00	1.00	5.00
2029-2030	1.00	1.00	1.00	1.00	1.00	5.00
2031-2032	1.00	1.00	1.00	1.00	1.00	5.00
2033-2034	1.00	1.00	1.00	1.00	1.00	5.00
2035-2036	1.00	1.00	1.00	1.00	1.00	5.00
2037-2038	1.00	1.00	1.00	1.00	1.00	5.00
2039-2040	1.00	1.00	1.00	1.00	1.00	5.00
2041-2042	1.00	1.00	1.00	1.00	1.00	5.00
2043-2044	1.00	1.00	1.00	1.00	1.00	5.00
2045-2046	1.00	1.00	1.00	1.00	1.00	5.00
2047-2048	1.00	1.00	1.00	1.00	1.00	5.00
2049-2050	1.00	1.00	1.00	1.00	1.00	5.00
2051-2052	1.00	1.00	1.00	1.00	1.00	5.00
2053-2054	1.00	1.00	1.00	1.00	1.00	5.00
2055-2056	1.00	1.00	1.00	1.00	1.00	5.00
2057-2058	1.00	1.00	1.00	1.00	1.00	5.00
2059-2060	1.00	1.00	1.00	1.00	1.00	5.00
2061-2062	1.00	1.00	1.00	1.00	1.00	5.00
2063-2064	1.00	1.00	1.00	1.00	1.00	5.00
2065-2066	1.00	1.00	1.00	1.00	1.00	5.00
2067-2068	1.00	1.00	1.00	1.00	1.00	5.00
2069-2070	1.00	1.00	1.00	1.00	1.00	5.00
2071-2072	1.00	1.00	1.00	1.00	1.00	5.00
2073-2074	1.00	1.00	1.00	1.00	1.00	5.00
2075-2076	1.00	1.00	1.00	1.00	1.00	5.00
2077-2078	1.00	1.00	1.00	1.00	1.00	5.00
2079-2080	1.00	1.00	1.00	1.00	1.00	5.00
2081-2082	1.00	1.00	1.00	1.00	1.00	5.00
2083-2084	1.00	1.00	1.00	1.00	1.00	5.00
2085-2086	1.00	1.00	1.00	1.00	1.00	5.00
2087-2088	1.00	1.00	1.00	1.00	1.00	5.00
2089-2090	1.00	1.00	1.00	1.00	1.00	5.00
2091-2092	1.00	1.00	1.00	1.00	1.00	5.00
2093-2094	1.00	1.00	1.00	1.00	1.00	5.00
2095-2096	1.00	1.00	1.00	1.00	1.00	5.00
2097-2098	1.00	1.00	1.00	1.00	1.00	5.00
2099-2100	1.00	1.00	1.00	1.00	1.00	5.00

Notes

Complete initial fire protection \$2,000,000 (includes: revised estimates in
 1952 of amount of total damage to be worked in each year - including both fire
 and protection efforts) - The amount of initial control work that has not already
 been estimated, \$2,175,000; estimate 50 per cent, or \$1,087,500 more, will need to

General throughout the commercial pine range of state, being especially severe in northern Connecticut River Valley region - based on town units, the per cent of diseased pine ranges from 1-30 per cent of the total amount of pine - also, see strip line data under "Surveys". Considerable new infection occurred in unprotected areas during 1928.

General throughout the country the commonest cause of death, being especially common in northern Connecticut River Valley region - based on town water, the per cent of disease in the region from 1-35 per cent of the total amount of time - also, was also time data under "Grippe". Considerable new infection occurred in uninfected areas during 1923.

Policy

State cooperates with individual owners, who pay all eradication costs, except excess labor charges for state foremen and their transportation between jobs. In a few instances, town money has been obtained to pay the excess labor charges.

Informational and Service Activities of Permanent and Temporary Agents, 1923-1932

Informational

Meetings addressed.....	369	Publications distributed.....	27,128
Attendance.....	17,897	Mimeo.articles dist.(1928-1932)...	170
Field demonstration meetings.....	383	Items published.....	400
Attendance.....	4,527	Posters and signs placed.....	7,064
Displays placed.....	518	Roadside dem.placed (1930-1932)...	13

Service

Initial interviews.....	8,720	Persons instructed in field.....	7,458
Follow-up calls.....	6,102		

Town and Individual Cooperation in Blister Rust Control Work

Period	Number Town Appropriations	Town Money Expended	Number Individual Cooperators	Amount Expended by Individuals
1918-1921	0	0	61	\$ 4,021.11
1922-1932	13	\$1,077.91	2,150	65,505.67
Totals	13	\$1,077.91	2,211	\$69,526.78

The individual expenditures include \$82.00 spent during 1926 for Ribes compensation to 9 owners for the removal of 164 cultivated bushes.

Results of Regular Ribes Eradication Work, 1918-1932, Inclusive (Initial and Re-eradication)

Period	Acreage Worked	Ribes Felled		Cost					Per Acre	
		Wild	Cult.	State	Towns	Indiv.	Govt.	Total	Cost	Ribes
1918-21	17,978	272,143	282	\$ 5,157.96	-	\$ 4,021.11	\$5,073.44	\$14,252.51	\$.793	15.1
1922-32	199,765	1,991,503	10,642	11,177.71	\$1,077.91	65,423.67	981.07	78,660.36	.394	10.0
Totals	217,743	2,263,646	10,924	16,335.67	\$1,077.91	\$69,444.78	\$6,054.51	\$92,912.87	\$.427	10.4

This summary excludes the special nursery sanitation work during the period 1930-1932, inclusive, when a separate record was kept of such control work.

The cost of the regular Ribes eradication project includes owners' labor (valued at 40 cents per hour) and actual expenditures for wages of laborers, scouts, and foremen employed in locating and pulling Ribes.

Importation

864,7 Initial inventory 03,8 Initial inventory
31,2 Value of stock

Year	Number of Inhabitants	Number of Inhabitants	Number of Inhabitants	Number of Inhabitants
1881-1882	1,000	1,000	1,000	1,000
1882-1883	1,000	1,000	1,000	1,000
1883-1884	1,000	1,000	1,000	1,000

[illegible]

This summary includes the special matters mentioned above. It also includes a separate report on the work of the Special Committee on the Work of the Commission.

The rest of the report contains information about the work of the Commission and its various committees and working groups.

Results of First Re-eradication of Ribes, 1923-1932, Inclusive

Acreage Reworked	Ribes Pulled		Cost					Per Acre	
	Wild	Cult.	State	Towns	Indiv.	Govt.	Total	Cost	Ribes
30,857	155,973	833	\$1,110.96	\$236.65	\$8,768.52	\$84.68	\$10,200.81	\$.331	5.1

No direct comparison is practicable between the per acre cost of the re-eradication work and the corresponding cost of all work since there is a variation in the acreage involved and consequently in the sites examined. However, the figures do indicate a decreased cost for the re-eradication work.

Status of Regular Ribes Eradication Work - December, 1932

Total Acreage of Control Area	Acreage of Control Area Worked		Acreage of White Pine		Est. Acreage White Pine Protected		Est. percent-age control area worked*		Acreage Still in Need of Protection	
	Initial Erad.	Re-erad.	Total in State	Total in Control Area	Initial Erad.	Re-erad.	Initial Erad.	Re-erad.	Initial Erad.	Re-erad.
301,954	186,886	30,857	567,084	120,782	74,754	12,343	61.9	10.2	115,068	271,097

*The percentages are the same for the pine area protected in the control area.

The total control area is the sum of the acreage initially cleared of Ribes to date plus the estimated acreage still in need of initial protection. The latter figure is based on estimates made by the agents of the acreage still in need of initial protection in each town of their districts.

The acreage of white pine in the control area was estimated to comprise 40 per cent of the entire area. Likewise, the acreage of pine protected was assumed to represent 40 per cent of the worked portion of the control area.

Nursery Sanitation

Exclusive of the state nursery, which has been protected from blister rust, there are only two commercial nurseries growing white pines and each of these nurseries contain less than 100 ornamental pines.

Ribes Eradication Work at the Essex Junction State Nursery, 1930-1932, Inclusive

Acreage Worked (All re-eradication)	Ribes Pulled		Total Cost	Per Acre	
	Wild	Cult.		Cost	Ribes
450	1,540	0	\$303.54	\$.675	3.4

Results of First Re-estimation of Ripped, 1930-1932, Inclusive

Average Worked (All re-estimation)	Ripped Felled		Cost		Per Acre	
	Wild	Cliff.	Initial	Total	Cost	Wild
150	1,240	0	18,743	10,258	115,058	271.00

The direct comparison is practicable between the per acre cost of the re-estimation work and the corresponding cost of all work since there is a variation in the acreage involved and consequently in the rates examined. However, the figures do indicate a decreased cost for the re-estimation work.

Status of Regular Ripped Re-estimation Work - December, 1932

Total Control Area	Average of White Pine	Average of White Pine Protected	Total Percent-ages controlled	Average still in need of Protection	Total in Control Area		Total in Control Area		Initial		Initial	
					Initial	Final	Initial	Final	Initial	Final	Initial	Final
100,258	18,743	10,258	115,058	271.00	10.2	11.5	10.2	11.5	10.2	11.5	10.2	11.5

*The percentages are the same for the pine area protected in the control area.

The total control area in the sum of the average initially cleared of Ripped to date plus the estimated average still in need of initial protection. The latter figure is based on estimates made by the agents of the average still in need of initial protection in each town of their districts.

The average of white pine in the control area was estimated to comprise 50 per cent of the entire area. Likewise, the average of pine protected was assumed to represent 50 per cent of the portion of the control area.

Murray Re-estimation

Exclusive of the state nursery, which has been protected from blister rust, there are only two commercial nurseries growing white pine and each of these nurseries contains less than 100 experimental trees.

Ripped Re-estimation Work of the Essex Re-estimation State Nursery, 1930-1932, Inclusive

Average Worked (All re-estimation)	Ripped Felled		Cost		Per Acre	
	Wild	Cliff.	Initial	Total	Cost	Wild
150	1,240	0	18,743	10,258	115,058	271.00

Since 1930, a separate record has been kept of all nursery sanitation work and the data have not been included in the regular Ribes eradication summaries. Due to the fact that the available data are incomplete for such control work prior to 1930 no accurate total summary can be made for this project. However, a summary (based on estimates in some instances) supplied by the assistant state forester shows that during the period 1925-1929, a total of 700 acres were reworked at this nursery at a cost of \$479.64. Only five wild Ribes were found. During 1930, this nursery was granted a permit to ship white pines interstate under regulations specified in Federal Quarantine 63. This permit was revoked in 1932 when a few Ribes were located within the 1500 ft. sanitation zone.

Black Currant Eradication

A systematic black currant survey was begun in the agents' districts during the fall of 1928 and continued during 1929. Such work has been completed in 20 towns and partially finished in 3 additional towns. A total of 224 Ribes nigrum were located and 183 were destroyed.

Cultivated Ribes Compensation

Total number of cultivated Ribes destroyed.....	10,924
Total number bushes paid for.....	1,577
Number persons paid compensation.....	127
Amount paid in reimbursement.....	\$762.66

These data include \$82.00 compensation paid by individual cooperators to 9 owners of cultivated Ribes for the removal of 164 bushes.

Surveys

(1) White pine areas of state - data suitably recorded on maps for each agent's use. (2) Strip line infection survey made in 1920. The pines on rod wide strips totaling 28 miles in length were examined - a total of 4,002 pines was inspected and 3.1 per cent found diseased. (3) Production, value, and use of white pine and other woods - data summarized for entire state, and published in bulletin form. (4) Epidemiology survey of white pine and other forest types, Ribes and infection conditions made during 1926. Maps and summaries prepared at Boston Office.

Investigations

Demonstration control areas at Thetford and Fairlee, Vermont - preliminary reports submitted - no follow-up work done. Ribes regrowth studies made by Merrill, and reported at 1927 annual conference. Blister rust damage study of merchantable pine made by Filler at Waterford, Vermont - report prepared. During 1927, six quarter acre infection plots laid out by agents. Also, in cooperation with the extension forester, six permanent demonstration plots were established to show white pine thinning and protection. Seven additional demonstration plots in six towns were laid out in 1928. During the fall of 1928 and spring of 1929, pine infection studies were made by the agents in 14 Vermont towns to determine the effectiveness of the control work. These

Since 1930, a complete record has been kept of all nursery operations and the data have not been included in the various Ribes eradication summaries. Due to the fact that the available data are incomplete for each control work prior to 1930 no accurate total nursery can be made for this project. However, a summary (based on estimates in some instances) compiled by the assistant state forester shows that during the period 1927-1931 a total of 700 acres were removed at this nursery at a cost of \$479.64. Only five wild Ribes were found. During 1930, this nursery was granted a permit to allow wild Ribes infestation under regulations established in Federal Quarantine 57. This permit was revoked in 1932 when a few Ribes were located within the 1900 ft. sanitation zone.

Black Current Eradication

A systematic black current survey was begun in the special districts during the fall of 1934 and continued during 1935. Much work has been completed in 30 towns and partially finished in 7 additional towns. A total of 24 Ribes nigra were located and 125 were destroyed.

Cultivated Ribes Compensation

Total number of cultivated Ribes destroyed.....	10,934
Total number acres paid for.....	1,577
Number persons paid compensation.....	127
Amount paid in reimbursement.....	\$462.55

These data include \$32.00 compensation paid by individual cooperators to owners of cultivated Ribes for the removal of 127 bushes.

Summary

- (1) White pine areas of state - data partially recorded on maps for each year.
- (2) Strip line infection survey made in 1935. The Ribes on red pine strips totaling 24 miles in length were examined - a total of 4,002 lines were inspected and 3.1 per cent found diseased. (3) Protection, value, and use of white pine and other woods - data summarized for entire state, and published in Bulletin form. (4) Epidemic survey of white pine and other forest types, Ribes and infection conditions made during 1936. Maps and summaries prepared at Boston Office.

Investigation

Demonstration control areas at Westford and Berlin, Vermont - preliminary report submitted - no follow-up work done. Ribes growth studies made by Merrill, and reported at 1937 annual conference. Ribes root damage study at Concordia in June made by Miller at Westford, Vermont - report prepared. During 1937, six control areas in section plots laid out by agents. Also, in cooperation with the extension forester, six permanent demonstration plots were established to show white pine thinning and protection. Seven additional demonstration plots in six towns were laid out in 1935. During the fall of 1935 and spring of 1936, nine infection studies were made by the agents in 14 Vermont towns to determine the effectiveness of the control work. These

data were summarized at the Boston Office and copies of the summaries sent to the Forestry Commissioner and to the Washington Office to be used for informational purposes. Additional effectiveness of control studies were made by Agent Rose during the fall and winter of 1932-1933.

Total Cost of All Blister Rust Control Work, 1918-1932, Inclusive

State Blister Rust Appropriation Funds	Individual Funds or Labor	Town Funds	Federal \$ for \$ Expenditures	Total
\$48,795.07	\$69,526.78	\$1,077.91	\$114,580.69	\$233,980.45

The total expenditures for all control work include cost of administration, supervision, blister rust control agent activities, Ribes eradication, field investigations, nursery sanitation, black currant eradication, Ribes compensation, and miscellaneous.

Relation of Total Cost of All Control Activities to Total Commercial Value of White Pine

Acreage of White Pine	Commercial Value of White Pine	Total Cost of All Control Activities, 1918-1932, Incl.	Per Cent of Total Commercial Value Represented by Cost of All Control Work
567,084	\$18,339,854.00	\$233,980.45	1.3

Comparison Between Cost Per Acre Based on Ribes Eradication Costs Only and on Cost of All Control Projects, 1918-1932, Inclusive

Ribes Per Acre	Cost Per Acre							
	Based on Ribes Eradication Costs Only				Based on Total Expenditures			
	1918-1932		Ave. Per Year		1918-1932		Ave. Per Year	
	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected
10.4	.427	1.07	.028	.071	1.07	2.69	.071	.179

Future Work

Complete initial Ribes eradication , 115,068 acres - based on estimates of acreage remaining to be worked in each town, including both pine areas and protection strips.

Re-examination of initial control areas which have not been re-eradicated of Ribes, 271,097 acres; estimate 50 per cent, or 135,548 acres, will need intensive working.

Costs were summarized at the Boston Office and copies of the summary sent to the Bureau. The summary was also sent to the Washington Office to be used for informational purposes. Additional effectiveness of control studies were made of Agent Jones during the fall and winter of 1932-1933.

Total Cost of All District Control Work, 1932-1933, Inclusive

Administrative Costs	Investigative Costs	Control Costs	Subtotal for Districts	Total
\$12,707.07	\$29,200.78	\$2,077.31	\$43,985.16	\$56,692.95

The total expenditures for all control work including cost of administration, district control agent salaries, office equipment, field investigation, necessary transportation, black current investigation, office communication, and miscellaneous.

Relation of Total Cost of All Control Activities to Total Commercial Value of White Pine

White Pine	Commercial Value of White Pine	Total Cost of All Control Activities, 1932-1933, Inclusive	Per Cent of Total Commercial Value
\$50,000	\$1,250,000	\$56,692.95	4.53

Comparison between Cost for Area Based on Silver Production Costs and on Cost of All District Projects, 1932-1933, Inclusive

Area	Cost for Silver Production	Cost for District Projects	Per Cent of Total Area	Per Cent of Total Area
Area	1932-1933	1932-1933	1932-1933	1932-1933
Area	1.07	1.07	1.07	1.07
Area	1.07	1.07	1.07	1.07
Area	1.07	1.07	1.07	1.07
Area	1.07	1.07	1.07	1.07
Area	1.07	1.07	1.07	1.07
Area	1.07	1.07	1.07	1.07
Area	1.07	1.07	1.07	1.07
Area	1.07	1.07	1.07	1.07
Area	1.07	1.07	1.07	1.07

White Pine

Complete initial silver production, 11,000 tons - based on estimates of reserves remaining to be worked in each town, including both mine and production areas.

Re-examination of initial control work which have not been re-examined at 1932, 1933, 1934, 1935, 1936, 1937, 1938, 1939, 1940, 1941, 1942, 1943, 1944, 1945, 1946, 1947, 1948, 1949, 1950, 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959, 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969, 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979, 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 2681, 2682, 2683, 2684, 2685, 2686, 2687, 2688, 2689, 2690, 2691, 2692, 2693, 2694, 2695, 2696, 2697, 2698, 2699, 2700, 2701, 2702, 2703, 2704, 2705, 2706, 2707, 2708, 2709, 2710, 2711, 2712, 2713, 2714, 2715, 2716, 2717, 2718, 2719, 2720, 2721, 2722, 2723, 2724, 2725, 2726, 2727, 2728, 2729, 2730, 2731, 2732, 2733, 2734, 2735, 2736, 2737, 2738, 2739, 2740, 2741, 2742, 2743, 2744, 2745, 2746, 2747, 2748, 2749, 2750, 2751, 2752, 2753, 2754, 2755, 2756, 2757, 2758, 2759, 2760, 2761, 2762, 2763, 2764, 2765, 2766, 2767, 2768, 2769, 2770, 2771, 2772, 2773, 2774, 2775, 2776, 2777, 2778, 2779, 2780, 2781, 2782, 2783, 2784, 2785, 2786, 2787, 2788, 2789, 2790, 2791, 2792, 2793, 2794, 2795, 2796, 2797, 2798, 2799, 2800, 2801, 2802, 2803, 2804, 2805, 2806, 2807, 2808, 2809, 2810, 2811, 2812, 2813, 2814, 2815, 2816, 2817, 2818, 2819, 2820, 2821, 2822, 2823, 2824, 2825, 2826, 2827, 2828, 2829, 2830, 2831, 2832, 2833, 2834, 2835, 2836, 2837, 2838, 2839, 2840, 2841, 2842, 2843, 2844, 2845, 2846, 2847, 2848, 2849, 2850, 2851, 2852, 2853, 2854, 2855, 2856, 2857, 2858, 2859, 2860, 2861, 2862, 2863, 2864, 2865, 2866, 2867, 2868, 2869, 2870, 2871, 2872, 2873, 2874, 2875, 2876, 2877, 2878, 2879, 2880, 2881, 2882, 2883, 2884, 2885, 2886, 2887, 2888, 2889, 2890, 2891, 2892, 2893, 2894, 2895, 2896, 2897, 2898, 2899, 2900, 2901, 2902, 2903, 2904, 2905, 2906, 2907, 2908, 2909, 2910, 2911, 2912, 2913, 2914, 2915, 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3580, 3581, 3582, 3583, 3584, 3585, 3586, 3587, 3588, 3589, 3590, 3591, 3592, 3593, 3594, 3595, 3596, 3597, 3598, 3599, 3600, 3601, 3602, 3603, 3604, 3605, 3606, 3607, 3608, 3609, 3610, 3611, 3612, 3613, 3614, 3615, 3616, 3617, 3618, 3619, 3620, 3621, 3622, 3623, 3624, 3625, 3626, 3627, 3628, 3629, 3630, 3631, 3632, 3633, 3634, 3635, 3636, 3637, 3638, 3639, 3640, 3641, 3642, 3643, 3644, 3645, 3646, 3647, 3648, 3649, 3650, 3651, 3652, 3653, 3654, 3655, 3656, 3657, 3658, 3659, 3660, 3661, 3662, 3663, 3664, 3665, 3666, 3667, 3668, 3669, 3670, 3671, 3672, 3673, 3674, 3675, 3676, 3677, 3678, 3679, 3680, 3681, 3682, 3683, 3684, 3685, 3686, 3687, 3688, 3689, 3690, 3691, 3692, 3693, 3694, 3695, 3696, 3697, 3698, 3699, 3700, 3701, 3702, 3703, 3704, 3705, 3706, 3707, 3708, 3709, 3710, 3711, 3712, 3713, 3714, 3715, 3716, 3717, 3718, 3719, 3720, 3721, 3722, 3723, 3724, 3725, 3726, 3727, 3728, 3729, 3730, 3731, 3732, 3733, 3734, 3735, 3736, 3737, 3738, 3739, 3740, 3741, 3742, 3743, 3744, 3745, 3746, 3747, 3748, 3749, 3750, 3751, 3752, 3753, 3754, 3755, 3756, 3757, 3758, 3759, 3760, 3761, 3762, 3763, 3764, 3765, 3766, 3767, 3768, 3769

Control work is carried on in cooperation with individuals. State scouts are used to examine town areas for Ribes, to eradicate such bushes in areas where they are few, and to designate sections requiring intensive control work which will be done by the pine owners under the direction of state foremen.

Informational and Service Activities of Permanent and Temporary Agents,
1923-1932

Informational

Meetings addressed.....	401	Publications distributed.....	140,756
Attendance.....	26,766	Mimeo. articles dist. (1928-1932)...	2,362
Field demonstration meetings.....	453	Items published.....	1,961
Attendance.....	3,332	Posters and signs placed.....	3,096
Displays placed.....	657	Roadside dem. placed (1930-1932)....	88

Service

Initial interviews.....	28,074	Persons instructed in field.....	10,681
Follow-up calls.....	10,180		

Town and Individual Cooperation in Blister Rust Control Work

Period	No. Town Appropriations	Town Money Expended	No. Individual Cooperators	Amount Expended by Individuals
1918-1921	4	\$1,699.22	81	\$5,984.10
1922-1932	0	0	16,904	77,646.45
Totals	4	\$1,699.22	16,985	\$83,630.55

The expenditures by individuals include \$1,630.25 spent on special black currant eradication work during the period 1930-1932, and \$50.65 on special nursery sanitation work in 1932.

Results of Regular Ribes Eradication Work, 1918-1932, Inclusive
(Initial and Re-eradication)

Period	Acreage Worked	Ribes Pulled		Cost					Per Acre	
		Wild	Cult.	State	Towns	Indiv.	Govt.	Total	Cost	Ribes
1918-21	81,877	2,414,873	10,345	\$15,164.40	\$1,699.22	\$5,984.10	\$21,827.18	\$44,674.90	\$546	29.5
1922-32	2,031,492	11,113,894	232,916	186,795.63	-	75,965.55	910.00	263,671.18	.130	5.5
Totals	2,113,369	13,528,767	243,261	\$201,960.03	\$1,699.22	\$81,949.65	\$22,737.18	\$308,346.08	\$146	6.4

Excludes special nursery sanitation work during the period 1930-1932, inclusive, when separate records were kept for this project - also excludes special black currant eradication work since 1929.

The cost of the regular Ribes eradication project includes owners' labor (valued at 40 cents per hour) and all expenditures for wages of laborers, scouts and foremen employed in locating and pulling Ribes.

Investigation and Service Activities of the Bureau of Prisons, 1951-1952

Information

100,000	Prisoners released	100
2,500	Prisoners released (1951-1952)	2,500
1,000	Prisoners released	1,000
3,000	Prisoners and other persons	3,000
50	Prisoners released (1951-1952)	50

Service

10,000	Prisoners released	10,000
2,500	Prisoners released (1951-1952)	2,500

Prison and Individual Cooperation in Prisoner Control Work

Period	No. of Prisoners	Amount of Money	No. of Individuals	Amount of Money
1951-1952	1	\$1,000.00	1	\$1,000.00
1952-1953	2	\$2,000.00	2	\$2,000.00
Total	3	\$3,000.00	3	\$3,000.00

The amount of money paid to individuals in the period 1951-1952, and 1953-1954, is shown in the table above. The amount of money paid to individuals in the period 1951-1952, and 1953-1954, is shown in the table above.

Summary of Prisoner Release Program, 1951-1952, Inclusive (Initial and Re-education)

Period	No. of Prisoners	Amount of Money	No. of Individuals	Amount of Money
1951-1952	1	\$1,000.00	1	\$1,000.00
1952-1953	2	\$2,000.00	2	\$2,000.00
Total	3	\$3,000.00	3	\$3,000.00

The amount of money paid to individuals in the period 1951-1952, and 1953-1954, is shown in the table above. The amount of money paid to individuals in the period 1951-1952, and 1953-1954, is shown in the table above.

The cost of the Prisoner Release Program, 1951-1952, Inclusive (Initial and Re-education) is shown in the table above. The cost of the Prisoner Release Program, 1951-1952, Inclusive (Initial and Re-education) is shown in the table above.

Results of First Re-eradication of Ribes, 1923-1932, Inclusive

Acreage	Ribes Pulled		Cost				Per Acre	
	Wild	Cult.	State	Indiv.	Govt.	Total	Cost	Ribes
342,277	518,820	5,264	\$11,912.25	\$18,819.53	\$652.50	\$31,384.28	\$.092	1.5

No direct comparison is practicable between the per acre cost of the re-eradication work and the per acre cost of all Ribes eradication, since there is a variation in the acreage involved and the sites examined.

Status of Regular Ribes Eradication Work - December, 1932

Total Acreage of Control Area	Acreage of Control Area Worked		Acreage of White Pine		Est. Acreage White Pine Protected		Est. Percent-age Control Area Worked*		Acreage Still in Need of Protection	
	Initial Erad.	Re-erad.	Total in State	Total in Control Area	Initial Erad.	Re-erad.	Initial Erad.	Re-erad.	Initial Erad.	Re-erad.
1,788,092	1,771,092	342,277	958,564	932,564	923,699	178,669	99.0	19.1	17,000	1,445,815

*The percentages are the same for the pine area protected in the control area.

The "control area" is the sum of the acreage initially cleared of Ribes plus the acreage still in need of initial protection work. The pine acreage initially protected is based on the total pine area of the state (data secured during the cartographical survey of 1927) excluding the acreages in those towns in Suffolk, Barnstable, Essex, and Middlesex Counties where no control work is contemplated. The acreage of pine reprotected was computed on the basis of its being the same proportion of the total control area as in the initial eradication.

Nursery Sanitation

Status of Nursery Sanitation Work - December, 1932

	Number of Important White Pine Growing Nurseries				Number Protected from Blister Rust			
	Reforestation Only	Ornamental Only	Both	Total	Reforestation Only	Ornamental Only	Both	Total
Commercial nurseries	1	15	4	20	1	11	3	15
State nurseries	5	-	-	5	5	-	-	5
Total	6	15	4	25	6	11	3	20

Summary of Timber Production of Michigan, 1937-1938, inclusive

Species	Michigan		Federal		State		Total	
	Vol.	Value	Vol.	Value	Vol.	Value	Vol.	Value
Pine	1,132,000	\$1,132,000	111,000	\$111,000	111,000	\$111,000	222,000	\$222,000
Other	1,132,000	\$1,132,000	111,000	\$111,000	111,000	\$111,000	222,000	\$222,000
Total	2,264,000	\$2,264,000	222,000	\$222,000	222,000	\$222,000	444,000	\$444,000

The direct comparison is practicable between the net acre cost of the re-creation work and the net acre cost of all timber eradication, since there is a variation in the methods involved and the sites examined.

Summary of Timber Production Work - December, 1938

Species	Michigan		Federal		State		Total	
	Vol.	Value	Vol.	Value	Vol.	Value	Vol.	Value
Pine	1,132,000	\$1,132,000	111,000	\$111,000	111,000	\$111,000	222,000	\$222,000
Other	1,132,000	\$1,132,000	111,000	\$111,000	111,000	\$111,000	222,000	\$222,000
Total	2,264,000	\$2,264,000	222,000	\$222,000	222,000	\$222,000	444,000	\$444,000

*The percentages are the same for the pine areas protected in the control area.

The "control area" is the sum of the average initially cleared of timber areas. The average will in need of initial protection work. The pine average initially protected is based on the total pine area of the state (data secured during the cartographic survey of 1937) including the averages in those towns in Sault Ste. Marie, Marquette, and Houghton Counties where no control work is contemplated. The average of pine reported was computed on the basis of the being the same proportion of the total control area as in the initial eradication.

Summary of Timber Production

Summary of Timber Production Work - December, 1938

Species	Michigan		Federal		State		Total	
	Vol.	Value	Vol.	Value	Vol.	Value	Vol.	Value
Pine	1,132,000	\$1,132,000	111,000	\$111,000	111,000	\$111,000	222,000	\$222,000
Other	1,132,000	\$1,132,000	111,000	\$111,000	111,000	\$111,000	222,000	\$222,000
Total	2,264,000	\$2,264,000	222,000	\$222,000	222,000	\$222,000	444,000	\$444,000

All nurseries growing white pines for public sale were cleared of Ribes prior to 1925. No separate records are available for this work. During 1925 and 1926, a special survey was conducted to eradicate all Ribes nigrum from within a mile of all pine growing nurseries. In this work, a total of 217 Ribes nigrum, 319 flowering currants, and 20 other cultivated Ribes were destroyed.

In 1927 and 1928, the protection zones were increased from 900 feet to 1500 feet. The policy of the state since that time has been to establish Ribes free conditions in the environs of only the more important white pine producing nurseries. It is believed that the expenditures necessary for the establishment and maintenance of such zones around any additional nurseries would not be justified because of the relatively limited number of white pines produced. The pines in the state nurseries and the important commercial nurseries are examined annually by representatives of the Division of Plant Pest Control. Each year a few infested have been found.

Since 1929 a separate record has been kept of the nursery sanitation project and these data have not been included in the summaries of the regular Ribes eradication work.

Ribes Eradication Work in Connection with Nursery Sanitation Project
1930-1932, Inclusive

Type of Work	Acreage Worked	Ribes Pulled		Total Cost	Per Acre	
		Wild	Cult.		Cost	Ribes
Initial eradication	247	1,396	80	\$ 142.19	\$.576	5.7
Re-eradication	1,812	236	49	1,399.10	.772	0.13
Total	2,059	1,632	129	\$1,541.29	\$.749	0.8

Prior to 1930, the nursery sanitation work was included in the regular Ribes eradication records. An incomplete summary, furnished by the state leader (based on estimates in several instances) shows that during the period 1925-1929, inclusive, a total of 15,450 acres were examined, 5,662 wild Ribes and 5,136 cultivated bushes being eradicated at a total cost of \$8,678.75. Of this total, 4,625 acres were re-eradication in which 21 wild and 648 cultivated Ribes were removed at a cost of \$918.90.

An inspection was made of the environs of the state nurseries by representatives of the Division of Blister Rust Control during the fall of 1932. As a result of this examination, it appears advisable to re-eradicate the environs of three of the state nurseries. Future sanitation work around commercial nurseries will be limited to re-examination of the environs of those nurseries which have already been initially protected.

Black Currant Eradication

Several thousand cultivated black currants were destroyed in Massachusetts during 1917 in connection with a state-wide cultivated Ribes census. During the period 1918-1926, black currants were eradicated in conjunction with the regular control work. In 1927, a special regulation was made effective prohibiting the possession of Ribes nigrum in the state, and a systematic campaign was begun to eliminate such bushes. However,

All nurseries growing white rhinos for public sale were closed or closed prior to 1957. No separate records are available for this work. During 1957 and 1958, a special survey was conducted to eradicate all rhino nurseries from within a mile of all line crossing nurseries. In this work, a total of 217 rhino nurseries, 319 rhino nurseries, and 20 other cultivated rhinos were destroyed.

In 1957 and 1958, the protection zones were increased from 200 feet to 1,000 feet. The policy of the state since that time has been to establish rhino free conditions in the environs of all the more important white rhino nurseries. It is believed that the establishment necessary for the establishment and maintenance of such zones around and additional nurseries would not be justified because of the relatively limited number of white rhinos produced. The rhinos in the state nurseries and the important commercial nurseries are examined annually by representatives of the Division of Plant and Animal Control. Each year a few infected rhinos have been found.

Since 1957 a separate record has been kept of the nursery sanitation project and these data have not been included in the summary of the regular rhino eradication work.

Rhino Sanitation Work in Connection with Nursery Sanitation Project
1957-1958, Inclusive

Type of Work	Rhinos (Total)	Rhinos Killed		Total Cost	Per Rhino	Total
		Wild	Cult.			
Sanitation	247	1,795	80	1,442.13	1.45	2.7
Sanitation	1,812	235	40	1,599.10	1.15	2.18
Total	2,059	1,630	120	11,541.23	1.10	0.8

From 1957, the nursery sanitation work was included in the regular rhino eradication records. An incomplete summary, furnished by the state leader (based on estimates in several instances) shows that during the period 1957-1958, inclusive, a total of 25,000 rhinos were examined, 2,412 rhinos and 2,138 cultivated rhinos being eradicated at a total cost of \$8,678.75. Of this total, \$625 were for re-creation in which 21 wild and 68 cultivated rhinos were removed at a cost of \$18.50.

An inspection was made of the environs of the state nurseries by representatives of the Division of Animal Control during the fall of 1957. As a result of this examination, it appears advisable to re-examine the environs of three of the state nurseries. Future sanitation work around commercial nurseries will be limited to re-examination of the environs of those nurseries which have already been initially protected.

Black Current Eradication

Several thousand cultivated black currants were destroyed in Massachusetts during 1957 in connection with a state-wide eradication of black currants. During the period 1957-1958, black currants were eradicated in connection with the regular control work. In 1957, a special regulation was made effective prohibiting the possession of black currants in the state, and a systematic campaign was begun to eliminate such plants. However,

during the years 1927, 1928, and 1929, this special project was conducted in conjunction with the regular field work and the records were not kept separately. During the three field seasons of 1930-1932, inclusive, this black currant work has been carried on strictly as a separate project. An inspection of 284,531 properties was made in 199 towns during this period. As a result of these inspections, 26,053 black currants were found and destroyed on 3,250 locations. At the end of the 1932 season, such black currant elimination work had been completed in 286 out of a total of 355 towns and cities in the state.

Cultivated Ribes Compensation, 1918-1932

Total number of cultivated Ribes pulled.....	269,999
Total number of bushes paid for.....	40,103
Number of persons paid compensation.....	637
Total amount paid in reimbursement.....	\$14,173.50

(These data include \$5,665.05 paid in 1918 to 253 persons for 16,517 bushes destroyed in 1917 and 1918, mostly in 1917. It is not possible to separate the 1917 data.)

Surveys

Cultivated Ribes census throughout entire state in 1917 - data compiled and a summary report prepared - used as a basis for inspections and eradication of Ribes nigrum. During 1920, strip line infection survey was made - the pines on a rod wide strip totaling 4.4 miles in length were examined - a total of 871 pines were inspected and 5.7 per cent were found infected - 9 plots, totaling 3 acres, were laid out adjacent to the strips; 27 per cent of the 637 pines in these plots were diseased - epidemiology survey by agents during 1926 of white pine and other types, Ribes and infection - maps and summaries prepared at Boston Office.

Investigations

Demonstration control areas established at Barre and Pembroke. Pine infection study made by Root at Pembroke, also infection studies made by Pickler at Sandisfield, and by Hodgkins at Swanzey - reports submitted. Cutting out of cankers studies made by Martin at Ipswich, and by Hodgkins at Pembroke - published report by Martin. Damage plots laid out by agents in western Massachusetts - used for demonstration and informational purposes. Sample forest type map made of Duxbury, used as basis for control work. Study on spread of disease from skunk currants started by Clave during 1927 - report presented at annual conference showed only limited spread from such Ribes. Since 1928, Agents Clave and Doore have conducted experiments to determine the effectiveness of certain chemicals in killing Ribes - preliminary reports have been given at the annual conferences. In 1932, additional chemical eradication plots were made in these two agents' districts under the supervision of Plunguian. Five of the Massachusetts agents, including the state leader, are cooperating in the study to determine the immunity of the Viking currant to blister rust infection. Also, a few additional plot studies have been made of blister rust damage.

during the years 1957, 1958, and 1959, this special project was conducted in connection with the regular field work and the results were not reported separately. During the years 1957-1959, inclusive, this special project work has been carried on as a separate project. An inspection of 25,000 properties was made in 1957, as a result of these inspections, 26,000 locations were found and destroyed on 2,000 locations. At the end of the 1957 season, such other control elimination work had been completed in 265 out of a total of 255 towns and cities in the state.

Cultivated Rices Compensation, 1957-1959

.....	208,000
.....	40,100
.....	200
.....	14,150

(These data include \$2,650.00 paid in 1957 to 257 persons for 16,577 acres destroyed in 1957 and 1958, mostly in 1957. It is not possible to separate the 1957 data.)

Surveys

Cultivated Rices cannot throughout entire state in 1957 - data compiled and a survey report prepared - used as a basis for inspections and eradication of Rices. During 1950, strip line inspection survey was made - the Rices on a red line strip totaling 4.4 miles in length were examined - a total of 671 acres were inspected and 7.7 per cent were found infected - 9 plots, totaling 3 acres, were laid out adjacent to the strip; 27 per cent of the 671 acres in these plots were diseased - approximately 180 of white pine and other types, Rices and infection - maps and summaries prepared at Boston Office.

Investigations

Demarcation control areas established at West and Fenwick. This infection study made by Root at Fenwick, also infection studies made by Root at Fenwick and by Root at Fenwick - reports submitted. Outing out of control areas made by Martin at Fenwick, and by Martin at Fenwick - published report by Martin, Fenwick. Rices laid out by agents in western Massachusetts - used for demarcation and infection control purposes. Single forest type map made of Fenwick, used as basis for control work. Study on control of disease from forest types started by Fenwick in 1957 - report submitted at annual conference and only limited report from Fenwick. In 1958, Agents Clark and Jones have conducted experiments to determine the effectiveness of certain chemicals in killing Rices - preliminary reports have been given at the annual conference. In 1958, additional chemical eradication plots were made in these two agents' districts under the supervision of Fenwick. Five of the Massachusetts agents, including the state leader, are cooperating in the study to determine the immunity of the Rices to blight and infection. Also, a few additional plots studies have been made of Rices and blight.

Total Cost of All Blister Rust Control Work, 1918-1932, Inclusive

State Blister Rust Appropriation	Other State Appropriation Funds	Individual Funds or Labor	Town Funds	Federal \$ for \$ Expenditures	Total
\$216,875.82	\$47,925.55	\$83,630.55	\$1,699.22	\$310,242.82	\$660,373.96

The total expenditures for all control activities include cost of administration, supervision, blister rust control agent activities, Ribes eradication, field tions, nursery sanitation, black currant eradication, Ribes compensation, and

Relation of Total Cost of All Control Activities to Total Commercial Value of White Pine

Acreage of White Pine	Commercial Value of White Pine	Cost of All Control Activities, 1918-1932, Incl.	% Of Total Commercial Value Represented by Cost of All Control Work
958,564	\$44,257,012.	\$660,373.96	1.5

Comparison Between Cost Per Acre Based on Eradication Costs Only and on Cost of All Control Projects, 1918-1932, Inclusive

Ribes Per Acre	Cost Per Acre							
	Based on Ribes Eradication Costs Only				Based on Total Expenditures			
	1918-1932		Average Per Year		1918-1932		Average Per Year	
	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected
6.4	.146	.280	.010	.019	.312	.599	.021	.040

Future Work

Complete initial eradication, 17,000 acres (based on estimate by state leader - includes both acreages of pine and protection strips). Re-examination of initial control areas that have not been re-eradicated of Ribes, 1,445,815 acres; estimate 50 per cent, or 714,907 acres, will need intensive reworking. Complete Ribes nigrum eradication throughout state - complete chemical eradication study - make additional studies to determine effectiveness of control.- maintain Ribes free conditions in the environs of pine growing nurseries.

Total Cost of All Control Activities, 1915-1935, Inclusive

State Department	State Lands	Individual Farms or Labor	State Lands	State Lands	Total
\$2,875.00	\$1,000.00	\$1,000.00	\$1,000.00	\$1,000.00	\$6,875.00

The total expenditures for all control activities include cost of administration, labor, material, supervision, interest on investment, depreciation, and miscellaneous.

Relation of Total Cost of All Control Activities to Total Commercial Value of State Lands

Commercial Value of State Lands	Cost of All Control Activities, 1915-1935, Inclusive	Ratio of Cost of All Control Activities to Commercial Value
\$24,275,012	\$6,875,000	1.5

Comparison Between Cost for Area Based on Protection Costs Only and on Cost of All Control Activities, 1915-1935, Inclusive

Area	Cost for Area Based on Protection Costs Only	Cost for Area Based on Cost of All Control Activities, 1915-1935, Inclusive
Area A	\$100,000	\$150,000
Area B	\$200,000	\$300,000
Area C	\$300,000	\$450,000
Area D	\$400,000	\$600,000
Area E	\$500,000	\$750,000
Area F	\$600,000	\$900,000
Area G	\$700,000	\$1,050,000
Area H	\$800,000	\$1,200,000
Area I	\$900,000	\$1,350,000
Area J	\$1,000,000	\$1,500,000

Notes

Complete initial investigation, 1900-1905, was based on estimate by state engineer - includes both measures of river and protection (river). Re-investigation of initial control areas that have not been re-investigated of river, 1905-1935, cost estimate 50 per cent. of 1900-1905 cost. All new intensive research. Complete river stream investigation - complete physical investigation study - make additional studies to determine effectiveness of control. - maintain river free conditions in the drainage of the growing nurseries.

All control work performed by state scouts, as wild Ribes are so few and localized. During the period 1929-1931, inclusive, all the control work in the state was confined to the elimination of Ribes nigrum.

ESTIMATING WHITE RICE YIELD

Factors and Components Affecting Value of White Rice

1. Pure white rice (92-100% white) - (over 60% yield)	15,000	15,000
2. Mixed white rice - (51-92% white in mixture)	0	0
3. Other areas with constant white rice allocation and reflecting	50,000	50,000
4. Total	15,000	15,000

Excludes those "other types" which have 1-50% white rice (above reflecting area), but do not contain white rice reflecting.

Basis for estimating value of white rice: normal rice is 15¢ per bushel. Average white rice is 15¢ per bushel. Mixed white rice is 15¢ per bushel. Other areas with constant white rice allocation and reflecting are 15¢ per bushel. Total value of white rice is 15¢ per bushel. Excludes those "other types" which have 1-50% white rice (above reflecting area), but do not contain white rice reflecting.

Normal rice prices under present conditions range from 15¢ to 25¢ per bushel. This is, however, a temporary situation which should return to normal. Rice economic conditions are normal.

Other Conditions

White rice is low and localized, averaging only 0.5¢ per bushel. Rice prices are low and localized, averaging only 0.5¢ per bushel. Rice prices are low and localized, averaging only 0.5¢ per bushel. Rice prices are low and localized, averaging only 0.5¢ per bushel.

Price Inflation Conditions

Price inflation, mostly from cultivated black corns - any of the inflation have been out.

Notes

All control work performed by state account, as white rice are no low and localized. During the period 1957-1961, inclusive, all the control work in the state was confined to the estimation of white rice.

Results of Informational and Service Activities, 1923-1932, Inclusive

Informational

Meetings addressed.....	138	Publications distributed.....	32,796
Attendance.....	12,074	Mimeo.articles dist.(1928-1932)..	2,250
Field demonstration meetings.....	22	Items published.....	289
Attendance.....	1,243	Posters and signs placed.....	2,104
Displays placed.....	81	Roadside dem.placed (1930-1932)..	3

Service

Initial interviews.....	2,467	Persons instructed in field.....	521
Follow-up calls.....	1,716		

Individual Cooperation in Blister Rust Control Work

No cooperation has been solicited except in 1918, 1923, and 1924 when eight individuals gave \$581.36 for conducting general control work in the state.

Results of Regular Ribes Eradication Work, 1918-1932, Inclusive
(Initial and Re-eradication)

Period	Acreage Worked	Ribes Pulled		Cost			
		Wild	Cult.	State	Indiv.	Govt.	Total
1918-21	103,261	81,242	4,251	\$ 7,451.57	\$550.00	\$ 8,759.98	\$16,761.55
1922-32	186,803	119,233	8,105	13,612.64	31.36	1,832.80	15,476.80
Totals	290,064	200,475	12,356	\$21,064.21	\$581.36	\$10,592.78	\$32,238.35

This summary excludes the special nursery sanitation work which was carried on only during 1932.

The cost of the regular Ribes eradication project covers all expenditures for the wages of laborers, scouts, and foremen employed in locating and pulling Ribes.

Results of First Re-eradication of Ribes, 1923-1932, Inclusive

Acreage Re-worked	Ribes Pulled		Cost			Per Acre	
	Wild	Cult.	State	Govt.	Total	Cost	Ribes
16,885	10,406	75	\$1,671.67	\$401.04	\$2,072.71	\$.123	0.62

No direct comparison is practicable between the per acre cost of the re-eradication work and the cost of all Ribes eradication, since there is a variation in

1901, 1902, 1903

2174

14-00000

Individuals have \$511.75 for conducting external control work in the state.

viewing, SPI-PII, and notations used in the
(notations of the initial)

Year	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	

This summary excludes the special inventory limitation rule which was carried on

The cost of the regular Timber Extraction project covers all expenditures for the wages of laborers, costs, materials employed in locating and cutting timber.

overload, SS-10-1, used to collapse-24 inch to 21 inch

— In fact, the cost of the direct conversion is practically between the low cost of the re-

the acreage involved and in the sites examined. Due to the scarcity of the bushes, there undoubtedly will be little difference between the average per acre cost of each successive eradication.

Status of Regular Ribes Eradication Work - December, 1932

Total Acreage of Control Area	Acreage of Control Area Worked		Acreage of White Pine		Est. Acreage White Pine Protected		Est. Percentage Control Area Worked*		Acreage Still in Need of Protection	
	Initial Erad.	Re-erad.	Total in State	Total in Control Area	Initial Erad.	Re-erad.	Initial Erad.	Re-erad.	Initial Erad.	Re-erad.
273,179	273,179	16,885	73,196	73,196	73,196	4,525	100.0	6.2	0	256,294

*The percentages are the same for the pine area protected in the control area.

The control area consists of the total acreage initially cleared of Ribes in the state and includes the total pine area.

Nursery Sanitation

There are 11 commercial nurseries growing ornamental white pines in the state, only 3 of which have more than 500 such trees, and 6 of the remainder have less than 100 white pines. During 1932, sanitation zones were established around 6 of the pine-growing nurseries. As a result of this work, 1,190 acres were cleared of 133 wild Ribes and 520 cultivated bushes at a total cost of \$506.43. These data are not included in the regular Ribes eradication summaries.

Black Currant Eradication

A state law prohibits the possession of such bushes in the state. A survey to locate Ribes nigrum was completed in two towns in 1927. These bushes were eradicated in 1928. During 1929, 1930, and 1931, all the control work was limited to the systematic eradication of Ribes nigrum. The work was continued during 1932 and the project has now been completed over the entire state with the exception of the city of Providence. As a result of this work, 15,675 black currants and 1,093 other cultivated Ribes have been removed at a total cost of \$9,527.97.

Cultivated Ribes Compensation, 1918-1932

Total number of cultivated bushes destroyed.....	29,645
Total number bushes paid for.....	1,410
Number of persons paid compensation.....	58
Total amount paid in reimbursement.....	\$509.79

Surveys

A rough survey of white pine areas in state was made by Sheals in 1920. This information has been used for control and informational purposes. During 1926, a cartographical survey was completed of white pine and other types, Ribes and infection conditions - these data summarized at Boston Office. A survey of the production of white pine and other woods in the state during 1925 was made by Anderson. Report prepared and published in News Letter. During 1928, Hurford began a survey to map the location of white pine and other forest types, and to estimate their contents. Two townships (Coventry and West Greenwich) were completed during 1928. Due to pressure of other work, this project was limited since 1929 to the field mapping of forest areas in the townships of North Providence, Lincoln, and Cumberland. A few towns were partially mapped. During 1931, a special survey was made of 16 plantations established during 1929 and 1930 with white pine stock from an out-of-state nursery. Of the 44,939 pines examined, 1,355 or 3 per cent were found to be infected with a total of 1,373 blister rust cankers. Data taken on the age of the cankers (determined by age of wood on which infection occurred) showed that in all cases the infections developed before the pines were shipped from the nursery. State officials took immediate action to prevent further shipments of white pine into Rhode Island from this nursery, and the nurseryman in question has cooperated to the fullest extent in offering to replace the infected stock with some other species according to the wishes of the individual planter.

Investigations

Study of Ribes regrowth and effectiveness of control made by Anderson - report prepared by Anderson and Fivaz.

Total Cost of All Blister Rust Control Work, 1918-1932, Inclusive

State Blister Rust Appropriation Funds	Other State Appropriation Funds	Individual Funds	Federal \$ for \$ Expenditures	Total
\$39,925.91	\$2,013.83	\$581.36	\$42,262.67	\$84,783.77

The total expenditures for all control work include cost of administration, supervision, blister rust control agent activities, Ribes eradication, field investigations, nursery sanitation, black currant eradication, Ribes compensation, and miscellaneous.

Relation of Total Cost of All Control Activities to Total Commercial Value of White Pine

Acreage of White Pine	Commercial Value of White Pine	Total Cost of All Control Activities	% Total Commercial Value Represented by Cost of All Control Activities
73,196	\$2,002,053.	\$84,783.77	4.2

A survey of white pine trees in state was made by Adams in 1930. This information has been used for control and eradication purposes. During 1935, a botanical survey was completed of white pine and other trees, shrubs and infection. A survey of the production of white pine was made by Anderson. Report prepared and published in June 1935. During 1935, Anderson began a survey to map the location of white pine and other forest trees, and to estimate their abundance. Two surveys (covering and West Greenland) were completed during 1935. One to determine the extent of white pine in the field and the other to determine the abundance of white pine in the field. A few trees were carefully examined. During 1935, a special survey was made of 10 plantations established in 1935 and 1936 with white pine stock from an out-of-state nursery. Of the 4,373 plants examined, 1,355 or 31 per cent were found to be infected with a total of 1,373 blisters. Data taken on the age of the carriers (determined by age of wood on which infection occurred) showed that in all cases the infection developed before the plants were shipped from the nursery. State officials took immediate action to prevent further shipments of white pine into Idaho from this nursery, and the nurseryman in question has cooperated to the fullest extent in efforts to reduce the infected stock with some other species according to the wishes of the individual blaster.

Investigations

State of Idaho reports and effectiveness of control made by Anderson - report prepared by Anderson and others.

Total Cost of All Blister Rust Control Work, 1915-1935, Exclusive

State Blister Rust Control Work	Other State Blister Rust Control Work	Individual Blister Rust Control Work	Total
131,352.91	25,013.82	442,262.07	604,628.80

The total expenditures for all control work include cost of administration, supervision, blister rust control agent activities, blower eradication, field investigation, nursery examination, other current eradication, blower eradication, and miscellaneous.

Relation of Total Cost of All Control Activities to Total Commercial Value of White Pine

Commercial Value of White Pine	Total Cost of All Control Activities	Total Commercial Value Represented by Cost of All Control Activities
71.166	604,628.80	4.2

Comparison Between Cost Per Acre Based on Ribes Eradication Costs Only and
On Cost of All Control Projects, 1918-1932, Inclusive

Ribes Per Acre	Cost Per Acre							
	Based on Ribes Eradication Costs Only				Based on Total Expenditures			
	1918-1932		Average Per Year		1918-1932		Average Per Year	
	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected
0.69	.111	.415	.007	.028	.292	1.09	.019	.073

Future Work

Protect pine plantations made outside control area. Re-examination of all control areas (256,294 acres) and eradication of Ribes in all likely sites such as: swamps, stream courses, fence rows, walls, cellar holes and roadways. This check work in likely sites will take a four-man crew at least two or three seasons - report on all control work in state - complete survey of forest types and an estimate of their contents - completion of Ribes nigrum project - maintain Ribes-free conditions in environs of pine growing nurseries.

BLISTER RUST CONTROL IN CONNECTICUT
Acreage and Commercial Value of White Pine

	<u>Acreage</u>	<u>Value</u>
Pure white pine (80-100% pine) - {Over 6" DBH.....	32,697	\$3,662,064.
Under 6" DBH.....	40,729	1,018,225.
Mixed white pine - (21-29% pine in mixture.....	57,794	1,618,232.
(30-79% pine in mixture.....	66,551	3,726,856.
Other types with scattered white pine stocking and restocking*.....	18,383	{128,681.-Pine Stocking 21,929.-Restocking
White pine restocking in pure merchantable and mixed white pine types.....	<u>34,688**</u>	<u>64,429.</u>
Totals.....	216,154	\$10,240,416.

*Excludes those "other types" which have 1-20% white pine (above restocking size), but do not contain white pine restocking.

**This acreage not included in total as it is already listed under pure and mixed white pine types.

Basis for estimating value of white pine: merchantable stumpage figured at normal value of \$7 per M - average volume per acre, pure merchantable white pine = 16 M bd.ft.; mixed white pine, 21-29% = 4 M bd.ft.; mixed white pine, 30-79% = 8 M bd.ft.; and white pine, above restocking size in other types = 1 M bd.ft. Pure stands of white pine under 6" DBH given normal value of \$25 per acre. Estimated normal per acre value of white pine restocking: degree of restocking, light = \$1, medium = \$2, heavy = \$3.

Stumpage prices under present abnormal conditions range from \$2 to \$6 per thousand board feet. This is, however, a temporary situation which should return to normal when economic conditions improve.

Ribes Conditions

Ribes are generally distributed and fairly abundant in Litchfield County. Over the remainder of the state, such bushes are few and localized. An average of 7.6 Ribes per acre have been pulled in conducting control work on 262,873 acres during the period 1918-1932, inclusive.

Pine Infection Conditions

General in northern Litchfield County - only spot infections, mostly old cankers, over remainder of state.

Policy

In Litchfield County, where pine and Ribes are more or less generally distributed, cooperation is conducted with individuals and towns, foremen and scouts being furnished by the state. Outside Litchfield County, ^{and 3 towns in Windham County} Ribes are comparatively few and localized; consequently, the control work is limited to scouting performed by state men.

LISTED WHITE PINE IN NEW HAMPSHIRE
Actual and Estimated Value of White Pine

Year	Actual	Estimated
1934	1,018,000	1,018,000
1935	1,018,000	1,018,000
1936	1,018,000	1,018,000
1937	1,018,000	1,018,000
1938	1,018,000	1,018,000
1939	1,018,000	1,018,000
1940	1,018,000	1,018,000
1941	1,018,000	1,018,000
1942	1,018,000	1,018,000
1943	1,018,000	1,018,000
1944	1,018,000	1,018,000
1945	1,018,000	1,018,000
1946	1,018,000	1,018,000
1947	1,018,000	1,018,000
1948	1,018,000	1,018,000
1949	1,018,000	1,018,000
1950	1,018,000	1,018,000
1951	1,018,000	1,018,000
1952	1,018,000	1,018,000
1953	1,018,000	1,018,000
1954	1,018,000	1,018,000
1955	1,018,000	1,018,000
1956	1,018,000	1,018,000
1957	1,018,000	1,018,000
1958	1,018,000	1,018,000
1959	1,018,000	1,018,000
1960	1,018,000	1,018,000
1961	1,018,000	1,018,000
1962	1,018,000	1,018,000
1963	1,018,000	1,018,000
1964	1,018,000	1,018,000
1965	1,018,000	1,018,000
1966	1,018,000	1,018,000
1967	1,018,000	1,018,000
1968	1,018,000	1,018,000
1969	1,018,000	1,018,000
1970	1,018,000	1,018,000
1971	1,018,000	1,018,000
1972	1,018,000	1,018,000
1973	1,018,000	1,018,000
1974	1,018,000	1,018,000
1975	1,018,000	1,018,000
1976	1,018,000	1,018,000
1977	1,018,000	1,018,000
1978	1,018,000	1,018,000
1979	1,018,000	1,018,000
1980	1,018,000	1,018,000
1981	1,018,000	1,018,000
1982	1,018,000	1,018,000
1983	1,018,000	1,018,000
1984	1,018,000	1,018,000
1985	1,018,000	1,018,000
1986	1,018,000	1,018,000
1987	1,018,000	1,018,000
1988	1,018,000	1,018,000
1989	1,018,000	1,018,000
1990	1,018,000	1,018,000
1991	1,018,000	1,018,000
1992	1,018,000	1,018,000
1993	1,018,000	1,018,000
1994	1,018,000	1,018,000
1995	1,018,000	1,018,000
1996	1,018,000	1,018,000
1997	1,018,000	1,018,000
1998	1,018,000	1,018,000
1999	1,018,000	1,018,000
2000	1,018,000	1,018,000
2001	1,018,000	1,018,000
2002	1,018,000	1,018,000
2003	1,018,000	1,018,000
2004	1,018,000	1,018,000
2005	1,018,000	1,018,000
2006	1,018,000	1,018,000
2007	1,018,000	1,018,000
2008	1,018,000	1,018,000
2009	1,018,000	1,018,000
2010	1,018,000	1,018,000
2011	1,018,000	1,018,000
2012	1,018,000	1,018,000
2013	1,018,000	1,018,000
2014	1,018,000	1,018,000
2015	1,018,000	1,018,000
2016	1,018,000	1,018,000
2017	1,018,000	1,018,000
2018	1,018,000	1,018,000
2019	1,018,000	1,018,000
2020	1,018,000	1,018,000
2021	1,018,000	1,018,000
2022	1,018,000	1,018,000
2023	1,018,000	1,018,000
2024	1,018,000	1,018,000
2025	1,018,000	1,018,000
2026	1,018,000	1,018,000
2027	1,018,000	1,018,000
2028	1,018,000	1,018,000
2029	1,018,000	1,018,000
2030	1,018,000	1,018,000
2031	1,018,000	1,018,000
2032	1,018,000	1,018,000
2033	1,018,000	1,018,000
2034	1,018,000	1,018,000
2035	1,018,000	1,018,000
2036	1,018,000	1,018,000
2037	1,018,000	1,018,000
2038	1,018,000	1,018,000
2039	1,018,000	1,018,000
2040	1,018,000	1,018,000
2041	1,018,000	1,018,000
2042	1,018,000	1,018,000
2043	1,018,000	1,018,000
2044	1,018,000	1,018,000
2045	1,018,000	1,018,000
2046	1,018,000	1,018,000
2047	1,018,000	1,018,000
2048	1,018,000	1,018,000
2049	1,018,000	1,018,000
2050	1,018,000	1,018,000
2051	1,018,000	1,018,000
2052	1,018,000	1,018,000
2053	1,018,000	1,018,000
2054	1,018,000	1,018,000
2055	1,018,000	1,018,000
2056	1,018,000	1,018,000
2057	1,018,000	1,018,000
2058	1,018,000	1,018,000
2059	1,018,000	1,018,000
2060	1,018,000	1,018,000
2061	1,018,000	1,018,000
2062	1,018,000	1,018,000
2063	1,018,000	1,018,000
2064	1,018,000	1,018,000
2065	1,018,000	1,018,000
2066	1,018,000	1,018,000
2067	1,018,000	1,018,000
2068	1,018,000	1,018,000
2069	1,018,000	1,018,000
2070	1,018,000	1,018,000
2071	1,018,000	1,018,000
2072	1,018,000	1,018,000
2073	1,018,000	1,018,000
2074	1,018,000	1,018,000
2075	1,018,000	1,018,000
2076	1,018,000	1,018,000
2077	1,018,000	1,018,000
2078	1,018,000	1,018,000
2079	1,018,000	1,018,000
2080	1,018,000	1,018,000
2081	1,018,000	1,018,000
2082	1,018,000	1,018,000
2083	1,018,000	1,018,000
2084	1,018,000	1,018,000
2085	1,018,000	1,018,000
2086	1,018,000	1,018,000
2087	1,018,000	1,018,000
2088	1,018,000	1,018,000
2089	1,018,000	1,018,000
2090	1,018,000	1,018,000
2091	1,018,000	1,018,000
2092	1,018,000	1,018,000
2093	1,018,000	1,018,000
2094	1,018,000	1,018,000
2095	1,018,000	1,018,000
2096	1,018,000	1,018,000
2097	1,018,000	1,018,000
2098	1,018,000	1,018,000
2099	1,018,000	1,018,000
2100	1,018,000	1,018,000

*Estimated value of white pine in New Hampshire, which have 1-20% white pine (above
estimating area), but do not contain white pine stockings.
**This volume not included in total as it is already listed under
pine and mixed white pine types.

Notes for estimating value of white pine: white pine is estimated at
normal value of \$1 per M - average volume per acre, white pine is \$1
of 1.5; mixed white pine, \$1-1.5 = \$1.5; mixed white pine, \$1-1.5 = \$1.5;
and white pine, above estimating area in other types = \$1.5. The volume of white
pine is \$1.5 per acre. Estimated normal per acre value
of white pine stockings: average of stockings, light = \$1, medium = \$2, heavy = \$3.

Stocking prices under present abnormal conditions range from \$2 to \$5 per thousand
seed board feet. This is, however, a temporary situation which should return to normal
when economic conditions improve.

White Pine

White pine is generally distributed and fairly abundant in Litchfield County. The
remainder of the state, and perhaps the New and local. An average of 1.5
per acre have been found in commercial control work on 11,517 acres during the
period 1915-1952, inclusive.

The Litchfield County

General in southern Litchfield County - 1915 and 1916, mostly old growth
over timbered of state.

Policy

In Litchfield County, where pine and white pine are more or less generally distributed
cooperation is conducted with individuals and towns, towns and county being the
basis by the state. The Litchfield County, where the cooperative use and local
land; consequently, the control work is limited to recording inventory by state and

Informational and Service Activities of Permanent and Temporary Agents
1923-1932

Informational

Meetings addressed.....	47	Publications distributed.....	12,155
Attendance.....	1,940	Mimeo.articles dist.(1928-1932)...	91
Field demonstration meetings.....	31	Items published.....	641
Attendance.....	693	Posters and signs placed.....	569
Displays placed.....	117	Roadside dem.placed (1930-1932)...	24

Service

Initial interviews.....	4,076	Persons instructed in field.....	1,533
Follow-up calls.....	3,033		

Town and Individual Cooperation in Blister Rust Control Work

Period	No. Town Appropriations	Town Money Expended	No. Individual Cooperators	Amount Expended by Individuals
1918-1921	0	0	2	\$ 400.00
1922-1932	23	\$12,187.89	288	7,954.29
Totals	23	\$12,187.89	290	\$8,354.29

The town funds expended include subscriptions by individuals. The expenditures by individuals include \$76.25 paid by individual cooperators (nurserymen) during 1930 to 12 owners of cultivated Ribes for the destruction of 114 bushes - also include \$761.36 spent by individuals on special nursery sanitation work during 1930-1932, inclusive.

Results of Regular Ribes Eradication Work, 1918-1932, Inclusive
(Initial and Re-eradication)

Period	Acreage Worked	Ribes Pulled		Cost					Per Acre	
		Wild	Cult.	State	Towns	Indiv.	Govt.	Total	Cost	Ribes
1918-21	13,470	125,263	8	\$ 4,613.02	-	\$ 400.00	\$2,349.09	\$ 7,362.11	.546	9.3
1922-32	249,403	1,870,550	22,274	39,758.44	\$12,187.89	7,116.68	7,242.35	66,305.36	.266	7.5
Totals	262,873	1,995,813	22,282	\$44,371.46	\$12,187.89	\$7,516.68	\$9,591.44	\$73,667.47	.280	7.6

This summary excludes the special nursery sanitation work performed during the period 1930-1932, inclusive, when a separate record was kept of this project.

The cost of the regular Ribes eradication work includes owners' labor (valued at 40 cents per hour) and all expenditures for wages of laborers, scouts, and foremen employed in locating and pulling Ribes. It also includes the cost of maintaining the state eradication crew camps.

Information and Service Activities of Personnel and Temporary Agents
1930-1932

Information

Applications distributed.....	47	.....	.....
Photo articles filed (1930-1932)...	1,040	.....	.....
Items published.....	31	.....	.....
Posters and signs placed.....	693	.....	.....
Roadside sign placed (1930-1932)...	11	.....	.....

Service

Persons instructed in field.....	1,076	.....	.....
.....	3,033	.....	.....

Town and Individual Cooperation in Raptor Band Control Work

Period	No. Towns Cooperating	Town Money Expended	No. Individuals Cooperators	Amount Expended by Individuals
1930-1932	0	0	2	\$ 400.00
1932-1935	23	\$12,187.89	253	\$7,004.23
Totals	23	\$12,187.89	255	\$7,404.23

The town funds expended include subscriptions by individuals. The expenditures by individuals include \$76.25 paid by individual cooperators (nurserymen) during 1930 to 1932 for the destruction of bird houses - also include \$761.36 spent by individuals on special nursery sanitation work during 1930-1932, inclusive.

Results of Regular Raptor Band Identification Work, 1930-1932, Inclusive
(Initial and Re-examination)

Period	Bands Identified	Wild Bands	Raptor Banded			Total
			State	Towns	Indiv.	
1930-1932	12,187	12,187	\$12,187.89	-	\$400.00	\$12,587.89
1932-1935	23,520	23,520	\$23,520.00	\$1,116.68	\$7,266.23	\$32,302.91
Totals	35,707	35,707	\$35,707.89	\$1,116.68	\$7,666.23	\$44,490.80

This summary includes the special nursery sanitation work performed during the period 1930-1932, inclusive, and a separate record was kept of this project.

The cost of the regular Raptor Banded identification work includes orders, labor (valued at 50 cents per hour) and all expenditures for wages of laborers, recruits, and for other employees in location and pulling birds. It also includes the cost of maintaining the state eradication crew camps.

Results of First Re-eradication of Ribes, 1923-1932, Inclusive

Acreage Reworked	Ribes Pulled		Cost					Per Acre	
	Wild	Cult.	State	Towns	Indiv.	Govt.	Total	Cost	Ribes
33,323	384,695	3,706	\$12,497.17	\$4,167.99	\$1,726.16	\$1,665.50	\$20,056.82	.602	11.5

All of the control work performed in Connecticut during 1932 was re-eradication.

No direct comparison is practicable between the per acre cost of the re-eradication work and the per acre cost of all Ribes eradication, since there is a variation in the acreage involved and in the sites examined. Most of the re-eradication to date has been in sections requiring crew work.

Status of Regular Ribes Eradication Work - December, 1932

Total Acreage of Control Area	Acreage of Control Area Worked		Acreage of White Pine		Est. Acreage White Pine Protected		Est. Percentage Control Area Worked*		Acreage Still in Need of Protection	
	Initial Erad.	Re-erad.	Total in State	Total in Control Area	Initial Erad.	Re-erad.	Initial Erad.	Re-erad.	Initial Erad.	Re-erad.
239,550	229,550	33,323	216,154	199,977	134,134	19,471	95.8	13.9	10,000	206,227

*The percentages are the same for the pine area protected in the control area.

The "total control area" is the sum of the acreage initially cleared of Ribes to date plus the acreage still in need of initial protection - the latter figure being an estimate supplied by the state leader. The pine acreage in the control area was estimated to be the acreage of the pure and mixed (30-79%) pine in the state. The acreage of pine protected was computed on the basis of its being the same proportion of the total worked area as the total pine in the total control area.

Nursery Sanitation

Status of Nursery Sanitation Work - December, 1932

	Number of Nurseries Growing 500 or More White Pines				Number of Nurseries Protected from Blister Rust			
	Reforestation Only	Ornamental Only	Both	Total	Reforestation Only	Ornamental Only	Both	Total
Commercial nurseries	0	8	6	14	0	4*	4**	8
State nursery	1	-	-	1	1	-	-	1
Total	1	8	6	15	1	4	4	9

*Three additional nurseries established sanitation zones, but abandoned them.

**One additional nursery established a sanitation zone, but abandoned it.

With concentration on the one hand and the other, the fine line was reflected in the control area.

The "total control zone" is the sum of the advanced initially closed of lines to give the covered still in need of initial protection - the latter figure being as follows: applied by the state leaders. The same amount in the control zone was added to the column of the first and second (5-7) give in the table. The average value protected was calculated on the basis of the party's own proportion of the total applied area as the total size in the total control zone.

Profitability: 2000-2001

*Tutor admitted - certificate established - certificate valid.

During the fall of 1927, 158 owners of nurseries were interviewed regarding blister rust control. Sixteen owners, desiring to ship pine out of New England, agreed to cooperate in maintaining official control areas around their nurseries. A preliminary Ribes survey of these areas resulted in sanitation zones being established around 11 of the nurseries in 1928. These nurseries were reworked in 1929. During the fall of 1929, the state leader made a survey of nurseries having or considering sanitation zones, to determine the owners' attitude towards state maintenance of these zones with the nurserymen contributing a substantial part of the costs. All agreed to cooperate in amounts ranging from \$25 to \$100 annually. Control work was performed around 13 nurseries in 1930 and around 12 (including state nursery) in 1931 and 1932. At the present time, only 8 of the 12 cooperating nurseries plan to maintain their sanitation zones.

Results of Ribes Eradication in Connection with Nursery Sanitation Project, 1930-1932
(Not included in regular Ribes eradication summaries)

Type of Work	Acreage Worked	Ribes Pulled		Total Cost	Per Acre	
		Wild	Cult.		Cost	Ribes
Initial eradication	6,587	5,352	102	\$689.93	\$.105	0.81
Re-eradication	29,513	3,802	834	2,484.20	.084	0.13
Total	36,100	9,154	936	\$3,174.13	\$.088	0.25

Prior to 1930, the data for the nursery sanitation were not kept separate and were included in regular Ribes eradication summaries. A summary supplied by the state leader (based on incomplete data) shows that from 1927-1929, inclusive, an additional 10,922 acres were cleared of 1,242 wild Ribes and 3,267 cultivated bushes at a total cost of \$1,707.36. Of this work prior to 1930, 5,580 acres were re-eradication, a total of 1,083 wild Ribes and 1,431 cultivated bushes being removed at a cost of \$694.90.

Black Currant Eradication

In July 1929, the Connecticut Legislature passed a bill prohibiting the planting, selling or possession of Ribes nigrum in the state. A systematic campaign to eradicate black currants was inaugurated during 1930 in connection with a census of cultivated Ribes. Such work has been continued each succeeding year and as a result the project has been completed in nine towns; a total of 272 Ribes nigrum and 15,669 other cultivated Ribes being destroyed at a cost of \$4,545.42.

Cultivated Ribes Compensation, 1918-1932

Total number of cultivated bushes destroyed.....	40,231
Total number of bushes paid for.....	175
Number of persons paid compensation.....	16
Amount paid in reimbursement.....	\$103.50

No compensation was paid prior to 1929. These compensation figures include \$76.25 paid by individual cooperators (nurserymen) during 1930 to 12 owners of cultivated Ribes for the destruction of 114 bushes.

Surveys

During 1920 and 1921, all pine areas in the commercial pine range were mapped on U.S.G.S. sheets, and an estimate made of their contents - data used as a basis for control work and for informational purposes. Epidemiology survey during 1926 of white pine and other types, Ribes and infection conditions - data summarized at Boston Office. During the winter of 1931-1932, a pre-eradication survey was made in the town of Cornwall. A detailed report of this survey is given in Vol. 16, No. 11 of the Blister Rust News.

Investigations

Ribes regrowth and effectiveness of control study by Endersbee, report prepared - crew experiment by Riley, preliminary report submitted - studies made by Clark and Riley during 1929 to determine effectiveness of control and need for reprotection - data summarized. In 1930 and 1931 strip line studies were made in Canaan, North Canaan, and Salisbury to determine the amount of blister rust infection in these towns. The data were used to show the need for eradication work. Two permanent pine infection data plots have been established in the town of Salisbury and a similar study plot was made in Cornwall during 1932. A special report of Plot #1 in Salisbury was prepared by Riley, and the details of Plot #2 are given in his 1931 annual report. The data for the Cornwall plot is given in Riley's 1932 annual report. A chemical eradication of Ribes study was started in 1932 under the direction of Plunguian. Tentative results indicate that the cost of such work is excessive compared to the hand pulling method. The state leader is also cooperating in the study to determine the immunity of the Viking currant to blister rust infection.

Total Cost of All Blister Rust Control Work, 1918-1932, Inclusive

State Blister Rust Appropriation Funds	Other State Appropriation Funds	Individual Funds or Labor	Town Funds	Federal \$ for Expenditures	Total
\$102,997.59	\$1,127.82	\$8,354.29	\$12,187.89	\$95,146.31	\$219,813.90

The total expenditures for all control work include cost of administration, supervision, blister rust control agent activities, Ribes eradication, nursery sanitation, black currant eradication, field investigations, Ribes compensation, and miscellaneous.

Relation of Total Cost of All Control Activities to Total Commercial Value of White Pine

Acreage of White Pine	Commercial Value of White Pine	Total Cost of All Control Activities, 1918-1932, Inclusive	% Total Commercial Value of White Pine Represented by Cost of All Control Work
216,154	\$10,240,416.	\$219,813.90	2.1

Summary

During 1950 and 1951, all nine areas in the commercial fishery were sampled on U.S.S. Albatross, and an estimate made of their combined catch - 1,000 tons. Control work and for information purposes. Fishery survey during 1950 of fish and other types, Biond and infection conditions - fish examined at various times during the winter of 1951-1952, a one-observation survey was made in the form of a survey. A detailed report of this survey is given in Vol. 11 of the Biond Survey.

Investigation

Fishes taken and effectiveness of control study by Biond, report prepared by Biond, preliminary report submitted - studies made by Clark and Biond during 1950 to determine effectiveness of control and for information - data collected. In 1951 and 1952, fish line studies were made in Biond, North Canada, and Biond to determine the amount of winter and infection in these areas. The data were used to make the basis for eradication work. Two permanent time infection data plots have been established in the town of Biond and a similar study plot was made in Cornwall during 1952. A special report of this is in Biond was prepared by Biond, and the details of this are given in his 1951 annual report. The data for the Cornwall plot is given in Biond's 1952 annual report. A chemical analysis of Biond study was started in 1952 under the direction of Biond. Tentative results indicate that the cost of such work is excessive compared to the usual fishing method. The state leader is also cooperating in the study to determine the feasibility of the work to Biond and infection.

Total Cost of All Winter and Control Work, 1948-1952, inclusive

State Biond and Other State Biond - Individual Biond	Accommodation Biond - Biond or Labor	General & for Biond Biond
\$1,127.32	\$8,341.62	\$19,127.32

The total expenditure for all control work includes cost of administration, Biond, Biond and control work activities, Biond eradication, Biond eradication, Biond current eradication, Biond investigation, Biond eradication, and Biond eradication.

Relation of Total Cost of All Control Activities to Total Commercial Value of White Fish

White Fish	Commercial Value of White Fish	Total Cost of All Control Activities, 1948-1952, inclusive	% Total Commercial Value of White Fish Represented by Cost of All Control
\$18,127	\$10,240,412	\$28,317.90	0.2

Comparison Between Cost Per Acre Based on Ribes Eradication Costs Only and on Costs of All Control Projects, 1918-1932, Inclusive

Ribes Per Acre	Cost Per Acre							
	Based on Ribes Eradication Costs Only				Based on Total Expenditures			
	1918-1932		Average Per Year		1918-1932		Average Per year	
	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected
7.6	.280	.480	.019	.032	.836	1.43	.056	.095

Future Work

Complete initial control work - 10,000 acres. Re-examination of initial control areas that have not been re-eradicated of Ribes, 206,227 acres; estimate 50 per cent, or 103,113 acres, will need intensive reworking. Complete survey of Ribes nigrum and elimination of these bushes in state - nursery sanitation measures applied to all nurseries growing white pine - complete inspection of all white pine plantations in state - additional studies to determine effectiveness of control work.

BLISTER RUST CONTROL IN NEW YORK

Acreage and Commercial Value of White Pine

	<u>Acreage</u>	<u>Value</u>
Pure white pine (80-100% pine) - {Over 6" DBH....	214,600	\$24,035,200.
Under 6" DBH...	457,171	11,429,275.
Mixed white pine - {20-29% pine in mixture.....	231,699	6,487,572.
{30-79% pine in mixture.....	242,218	13,564,208.
Other types with scattered white pine stocking and restocking*.....	170,269	(1,191,8 221,2
White pine restocking in pure merchantable and mixed white pine types.....	115,835**	197,847.
Totals.....	1,315,957	\$57,127,222.

*Excludes those "other types" which have 1-20% white pine (above restocking size), but do not contain white pine restocking.

**This acreage not included in total as it is already listed under pure and mixed white pine types.

Basis for estimating value of white pine: merchantable stumpage figured at normal value of \$7 per M - average volume per acre, pure merchantable white pine = 16 M bd.ft.; mixed white pine, 21-29% = 4 M bd.ft.; mixed white pine, 30-79% = 8 M bd.ft.; and white pine, above restocking size in other types = 1 M bd.ft. Pure stands of white pine under 6" DBH given normal value of \$25 per acre. Estimated normal per acre value of white pine restocking: degree of restocking, light = \$1, medium = \$2, heavy = \$3.

Stumpage prices under present abnormal conditions range from \$2 to \$6 per thousand board feet. This is, however, a temporary situation which should return to normal when economic conditions improve.

Ribes Conditions

Wild Ribes are generally distributed throughout the state, being most abundant in the northeastern portion of Lewis and Warren Counties. In this section there occurs especially heavy concentrations of large size Ribes rotundifolium. The Ribes in the western half of New York are more localized and much of the control work can be done by scouting methods.

Pine Infection Conditions

General and abundant in commercial white pine range of the state, especially in Lewis and Warren Counties; spot infections in other parts caused principally by infected stock or Ribes nigrum. In generally infested region, on a basis of town units, the per cent of diseased pine ranges from 1-30 per cent of the total amount of pine. Also, see strip line data under "Surveys".

SELECTED WHITE PINE STOCKING IN NEW YORK

Estimated Commercial Value of White Pine

Volume	Value	Notes
11,483,275	21,171	White pine (10-150 ft) - (Over 50% of total)
13,754,202	24,818	Mixed white pine (10-150 ft) - (Over 50% of total)
1,194,287	1,194,287	Other types with scattered white pine stocking
1,194,287	1,194,287	and restocking
1,194,287	1,194,287	White pine restocking in pure commercial and
1,194,287	1,194,287	mixed white pine types
1,194,287	1,194,287	Total

* Included some "other types" which have 1-20% white pine (above restocking area), but do not contain white pine restocking. This acreage not included in total as it is already listed under pure and mixed white pine types.

Basic for estimating value of white pine: merchantable stumpage figured at normal value of \$7 per M - average volume per acre, pure merchantable white pine = 15 M dbh ft.; mixed white pine, 31-39% = 4 M dbh ft.; mixed white pine, 30-39% = 3 M dbh ft.; and white pine, above restocking area in other types = 1 M dbh ft. Pure stands of white pine under 6" DBH given normal value of \$25 per acre. Estimated normal per acre value of white pine restocking: light = \$1, medium = \$2, heavy = \$3.

Strategic prices under present abnormal conditions range from 25 to 50 per thousand board feet. This is, however, a temporary situation which should return to normal when economic conditions improve.

White Pine Conditions

White pine is generally distributed throughout the state, being most abundant in the northeastern portion of Lewis and Warren Counties. In this section there occurs especially heavy concentrations of large size white pine. The white pine in the northern half of New York are more localized and much of the control work can be done by spotting methods.

White Pine Infection Conditions

General and abundant in commercial white pine stands of the state, especially in Lewis and Warren Counties; spot infection in other parts caused principally by infected stumps or white pine. In generally infected regions, on a basis of four units, the per cent of diseased pine ranges from 1-30 per cent of the total amount of pine. Also, see also line data under "Survey".

Policy

Protection of white pine on state lands and on lands owned by counties and individuals. State cooperates with such owners by furnishing, at state expense, foremen to supervise control work. In the future, control work on the state forest preserve will be restricted chiefly to pine areas of scenic importance; isolated pine areas of medium or old growth will not be protected.

Informational and Service Activities of Permanent and Temporary Agents, 1923-1932

Informational

Meetings addressed.....	965	Publications distributed.....	127,918
Attendance.....	81,435	Mimeo.articles dist.(1928-1932).....	3,575
Field demonstration meetings.....	265	Items published.....	2,023
Attendance.....	4,451	Posters and signs placed.....	8,640
Displays placed.....	450	Roadside dem.placed (1930-1932).....	7

Service

Initial interviews.....	19,743	Persons instructed in field.....	13,713
Follow-up calls.....	15,128		

County and Individual Cooperation in Blister Rust Control Work 1918-1932, Inclusive

Period	No. County Appropriations	County Money Expended	No. Individual Cooperators	Amount Expended by Individuals
1918-1921	-	-	41	\$12,026.08
1922-1932	30	\$5,898.40	5,328	149,264.32
Totals	30	\$5,898.40	5,369	\$161,290.40

Results of Regular Ribes Eradication Work, 1918-1932, Inclusive (Initial and Re-eradication)

Period	Acreage Worked	Ribes Pulled		Cost					Per Acre	
		Wild	Cult.	State	Indiv.	Counties	Govt.	Total	Cost	Ribes
1918-21	74,152	5,114,938	13,743	\$ 73,087.77	\$ 12,026.08	-	\$116,899.06	\$202,012.91	2.72	69.0
1922-32	788,933	14,246,279	41,327	359,073.83	149,126.75	\$5,898.80	15.00	514,114.38	.652	18.1
Totals	863,085	19,361,217	55,070	\$432,161.60	\$161,152.83	\$5,898.80	\$116,914.06	\$716,127.29	.830	22.4

Special nursery sanitation work for the period 1930-1932, inclusive, is not included in this summary.

The cost of the regular Ribes eradication project includes owner labor (valued at 40 cents per hour) and all expenditures for wages of laborers, linemen, scouts, and

Foreman employed in location and pulling timber. It also covers the cost of the state eradication fund.

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and crane of

Results of first re-eradication of disease, 1927-1932, inclusive

Year	Area initially infected	Area eradicated	Area re-eradicated	Area still infected	Total area infected
1927-1932	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000

The direct comparison is practicable between the per cent of the work and the corresponding cost of the initial eradication work (which was 2) since there is a variation in the areas involved and costs. The figures do however indicate a decreased cost per acre.

Status of Southern Pine Eradication Work - December, 1932

Area	Area initially infected	Area eradicated	Area re-eradicated	Area still infected	Total area infected
1932	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000

The percentages are the same for the pine area protected in the year 1932.

The total control area includes the total acreage initially infested, 2,500,000. The total area infested is 2,500,000. The total area eradicated is 2,500,000. The total area re-eradicated is 2,500,000. The total area still infested is 2,500,000. The total area infested is 2,500,000.

1,000,000	1,000,000	1,000,000	1,000,000
1,000,000	1,000,000	1,000,000	1,000,000

Summary of Eradication Work

Status of Eradication Work - December, 1932

Area	Area initially infected	Area eradicated	Area re-eradicated	Area still infected	Total area infected
1932	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000

During the past several years, sanitation measures have been applied to protect the pine areas in the state nurseries. The protection zones were for some time maintained at 900 feet. During 1928, this distance was increased to 1500 for all Ribes, except nigrum, which were eradicated within one mile of the pine areas. To date, Ribes nigrum have been eradicated from within one mile of each of the seven state nurseries (including Syracuse nursery) and the 900 foot Ribes free zones have been completely extended to 1500 feet.

In addition to the state nurseries, there are 262 commercial nurseries growing white pine in New York. These private pine-growing nurseries contained 364,544 white pines in 1932. Of this total number of trees, 207,700 were located in three nurseries. Only 58 of the private nurseries were growing 500 or more white pine, and only 10 had 5,000 or more of such trees. During 1928, the first attempt was made to establish protection zones surrounding some of these nurseries, particularly in Wayne and Westchester Counties. It soon became apparent that cultivated Ribes were extremely abundant in the vicinity of the various nurseries. As compensation had to be paid for such bushes destroyed, it was evident the work would have to be limited. Therefore, it was restricted to a general survey to determine and record Ribes conditions in the environs of the nurseries in these counties and to the eradication of Ribes nigrum in such situations. According to the revised state blister rust law, effective February 17, 1930, no compensation shall be paid by the state for any species of Ribes destroyed in connection with the establishment of Ribes free zones around commercial nurseries, but fair compensation for such bushes must be paid by the person owning or operating the protected nursery.

During 1930, a Federal pine shipping permit was issued to the Jackson & Perkins Nursery of Newark, New York. This company may therefore ship white pines interstate according to the regulations of Quarantine 63. This is the only private nursery in New York that has desired to establish sanitation zones.

Results of Ribes Eradication Work at New York State Nurseries
1930-1932, Inclusive

Type of Work	Acreage Worked	Ribes Pulled		Total Cost	Per Acre	
		Wild	Cult.		Cost	Ribes
Initial eradication	3,055	13,137	634	\$ 1,159.85	.380	4.3
Re-eradication	26,819	71,950	906	9,082.56	.339	2.7
Total	29,874	85,087	1,540	\$10,242.41	.343	2.8

Since 1930, a separate record has been kept of the nursery sanitation work and the data have not been included in the regular Ribes eradication summaries.

An attempt was made to compile a summary of the nursery sanitation work prior to 1930 but in some instances it was not possible to separate the data. An incomplete summary based on available records shows that during the period 1925-1929, a total of 17,782 acres were cleared of 138,842 wild Ribes and 294 cultivated bushes at a total cost of \$6,735.22. Of this work, 9,020 acres were re-eradication; 97,047 wild and 294 cultivated Ribes being destroyed at a cost of \$4,795.28.

During the past several years, sanitation measures have been applied to protect the pine areas in the state nurseries. The protection zones were for some time maintained at 300 feet. During 1938, this distance was increased to 1500 feet for all pines except those which were established within one mile of the pine areas. No data, however, have been reported from within one mile of the pine state nurseries (including the Syracuse nursery) and the 300 foot buffer zone has been completely excluded to 1500 feet.

In addition to the state nurseries, there are 257 commercial nurseries growing white pine in New York. These private pine-growing nurseries contained 30,744 white pines in 1938. Of this total number of trees, 207,900 were located in three nurseries. Only 7% of the private nurseries were growing 500 or more white pine, and only 10 had 1,000 or more of such trees. During 1938, the first attempt was made to establish protection zones surrounding some of these nurseries, particularly in the one and half-acre nurseries. It soon became apparent that cultivated pines were extremely abundant in the vicinity of the various nurseries. As compensation had to be paid for such further damage, it was evident the work would have to be limited. Therefore, it was restricted to a general survey to determine and record pines conditions in the vicinity of the nurseries in those counties and to the eradication of pines within in such situations. According to the revised state buffer zone law, effective January 17, 1930, no compensation shall be paid by the state for any species of pines destroyed in connection with the establishment of pines from commercial nurseries, but fair compensation for such losses must be paid by the person owning or controlling the protected nursery.

During 1930, a Federal pine striping permit was issued to the Jackson & Perkins Nursery of New York, New York. This company has therefore this white pine interstate according to the regulations of Quarantine 63. This is the only private nursery in New York that has been desired to establish sanitation zones.

Results of Pines Eradication Work at New York State Nurseries
1937-1938, Inclusive

Type of Work	Acres Treated	Pines Killed 1937-1938	Total Cost	Per Acre (Cost of Pines)
Initial eradication	3,000	17,177	\$1,166.45	0.4
Re-eradication	22,222	11,920	9,082.52	0.4
Total	25,222	29,097	\$10,248.97	0.4

Since 1930, a separate record has been kept of the nursery sanitation work and the data have not been included in the regular pines eradication summaries.

An attempt was made to compile a summary of the nursery sanitation work prior to 1930 but in some instances it was not possible to determine the data. An incomplete summary based on available records shows that during 1925-1928, a total of 17,712 acres were cleared of 178,842 white pines and 294 cultivated pines at a total cost of \$6,737.52. Of this work, 9,250 acres were re-eradication; 7,007 white and 294 cultivated pines were destroyed at a cost of \$1,795.68.

Black Currant Eradication

The New York State law prohibits the possession of *Ribes nigrum*. A systematic campaign to eradicate such bushes was inaugurated in 1928. During the period 1928-1932, inclusive, such work was completed in 201 out of a total of 1012 towns and cities in the state. As a result, 24,308 black currants and 761 other cultivated *Ribes* were destroyed at a total cost of \$18,486.25.

Cultivated Ribes Compensation 1918-1932

Total number of cultivated bushes destroyed.....	81,679
Number of bushes paid for.....	14,744
Number of persons paid compensation.....	1,023
Amount paid in reimbursement.....	\$4,918.99

Surveys

Strip line infection survey made by Brooks in 1920 - the pines on rod wide strips, totaling 28.4 miles in length, were examined; a total of 12,297 pines were inspected, and 5.1 per cent found diseased; 16 plots, totaling 15.1 acres, were laid out adjacent to the strips - 17.5 per cent of the 14,455 pines in these plots were diseased. In 1922, Fivaz made a similar strip study near Warrensburg of 12.1 miles in length and found 21 per cent of the 8,139 pines infected. During 1920 and 1921, Amadon made survey of white pine in parts of Essex and Warren Counties - the pine areas have been designated on U.S.G.S. maps, but no summary has been made of acreage or contents of the stands - maps used as basis for control work. Cartographical survey made by agents and Corliss, during 1926 and 1927, of white pine and other forest types, *Ribes*, and infection conditions - maps and summaries prepared at Boston Office. During the period 1927 to 1931, McIntyre had maps made of the pine and hardwoods types in all the main pine growing counties of the state. These maps have been of special use in control work. During 1932, a successful effort was made in two districts to refine the mapping system so as to obtain detailed information.

Investigations

Selective *Ribes* eradication experiment at North Hudson - not completed - no report. Effectiveness of control study made by Fivaz - preliminary report only. Blister rust damage studies by York and Snell - published in Journal of Forestry. *Ribes* ecology studies by Littlefield and Fivaz - results of Fivaz's study published in 1931. Damage study of pine plantation at Schroon River - preliminary report prepared by Ford. During 1928, the pines were examined for infection in 30 plots (each approximately one acre in size) 15 of the plots being laid out in areas cleared of *Ribes* prior to 1925, and the other 15 in tracts not eradicated of such bushes in the same towns. The study showed that since the time of eradication, over fifteen times as much infection has originated in the unprotected tracts, as in the protected areas. During 1929, nine additional pairs of comparable plots were examined by the agents and the data summarized at the Boston Office. Three of the New York agents cooperated during 1932 in the study to determine the immunity of the Viking currant to blister rust infection.

[illegible]

Total Cost of All Blister Rust Control Work, 1918-1932, Inclusive

State Blister Rust Appropriation Funds	Other State Appropriation Funds	County Funds	Individual Funds or Labor	Federal \$ for \$ Expenditures	Total
\$832,018.87	\$15,331.68	\$5,898.80	\$161,290.40	\$463,276.22	\$1,477,815.97

The total expenditures for all control work include cost of administration, supervision, blister rust control agent activities, Ribes eradication, eradication assistants, nursery sanitation, black currant eradication, field investigations, Ribes compensation, and miscellaneous.

Relation of Total Cost of All Control Activities to Total Commercial Value of White Pine

Acreage of White Pine	Commercial Value of White Pine	Total Cost of All Control Activities, 1918-1932, Inclusive	% Total Commercial Value of White Pine Represented by Cost of All Control Activities
1,315,957	\$57,127,222.	\$1,477,815.97	2.6

Comparison Between Cost Per Acre Based on Ribes Eradication Costs Only and on Cost of All Control Projects, 1918-1932, Inclusive

Ribes Per Acre	Cost Per Acre							
	Based on Ribes Eradication Costs Only				Based on Total Expenditures			
	1918-1932		Average Per Year		1918-1932		Average Per Year	
	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected	Total Area Worked	Pine Area Protected
22.4	.830	1.38	.055	.091	1.71	2.85	.114	.190

Future Work

Complete initial eradication work on state and individually owned lands - 566,893 acres (basis: estimates made by agents of acreage still needing initial eradication work in each town, including both pine areas and protection strips. Outside the agent districts the areas in need of initial eradication were estimated to be the acreage of the pure and mixed (30-79 per cent) pine plus an additional 50 per cent for protection zones.) Re-examination of 1,334,530 acres that have not been re-eradicated of Ribes - estimate 50 per cent or 667,265 acres will require intensive reworking. Elimination of Ribes nigrum throughout the state - application of adequate sanitation measures in environs of all important pine growing nurseries - application of control measures in areas to be planted to white pine.

The total expenditures for all control work include cost of administration, supervision, district post control activities, field investigation, execution, laboratory examination, local current examination, field investigations, crime commission.

Activity	1972-1973, Inclusive	Total Cost of All Control Activities, 1972-1973, Inclusive	Total Commercial Value of Control Activities
Control of the flow of information	\$1,115,715.97	\$1,115,715.97	\$1,115,715.97
Control of the flow of funds	9.2	9.2	9.2

1:20' 9" 10"

... to be related to this case.

Wild Ribes are known to exist in the northern part of the state, particularly on Waywayonda Mountain and near West Milford, where Ribes rotundifolium, vulgare, and americanum have been found. The location of the wild Ribes in relation to the more important pine areas is such that the destruction of these bushes does not appear urgent.

[illegible]

and also to safety improved the system

From a forestry viewpoint, there is very little white pine in the state; however, it has been planted extensively as an ornamental, especially in the Red Bank and Harrison sections. In Lewis County, a light stocking (less than 50 per cent) of white pine is found in hardwood types in the Greenwood Lake section, on Bearfoot Mountain, and near West Milford. At the last place, there is almost a pure stand of white pine containing several acres. Also, in Essex County, a light stocking of white pine exists on Cayuga State Mountain (from Vernon north to the state line). In Monticello, Sparta Mountain, Kittling Mountain, and around Grapewine Lake. It is most abundant in the northern part of Monticello. In Warren County, there is also a light stocking along the Delaware River between Columbia and Hamlet, N.Y.

*Excluded from "other type" which have 1-20% fine (above retentive size).
 *This amount not included in total as it is already listed under pure and
 does not contain white fine retentive.

For estimating value of white pine: merchantable stands figured at normal value of \$7 per cu. ft. - average volume per acre, pure merchantable white pine = 10 cu. ft.; mixed white pine, 25-50% = 4 to 10 cu. ft.; mixed white pine, 50-75% = 8 to 10 cu. ft.; and white pine, above restocking line in other types = 1 to 5 cu. ft. Pure stands of white pine under 6" DBH given normal value of \$25 per acre. Restocked normal for all values of white pine restocking: heavy of restocking; light = \$1, medium = \$2, and heavy of restocking = \$3.

Stagnant prices under present financial conditions range from 10 to 15 per cent below par. This is, however, a temporary situation which should return to normal soon economic conditions improve.

enough to get out

Wild birds are known to exist in the northern part of the state, particularly in the mountains and near the coast, where they are numerous, and the location of the wild birds in relation to the state is such that the distribution of these birds does not appear to be uniform.

Pine and Ribes Infection Conditions

First found in New Jersey in 1911 on pines at the Newark watershed near Charlotteburg. Since then, infection has been found somewhere in the state every year with exceptions of 1912, 1914, 1915, 1923, and 1929. Scouting in 1927 showed the disease more generally prevalent than ever before, being found on Ribes in 21 localities in seven counties. No pine infection has been reported since 1918.

Policy

Prior to 1929, all blister rust activities in this state were conducted by a few temporary men, employed during the summer months, on scout work to determine pine, Ribes and infection conditions. Since August, 1929, a permanent agent has been employed on a part time basis. Due to the limited amount of native white pine, his activities are confined chiefly to nursery sanitation, black currant eradication, inspection and protection of plantations, scouting, and direction of control work where needed.

Informational and Service Activities

No complete records are available of such activities performed by the part time agent.

Regular Ribes Eradication Work

No wild Ribes eradication work has been performed in the state except that done around the state nursery at Washington Crossing during 1932. The results of this work are summarized under "Nursery Sanitation".

Nursery Sanitation

In addition to the state nursery at Washington Crossing, there are 86 commercial nurseries growing white pine. Only 28 of these private nurseries contain 500 or more trees of this species.

The initial eradication of Ribes in the one mile sanitation zone around the state nursery was completed in 1932 when 462 Ribes americanum and 49 cultivated bushes were removed on 1,000 acres at a total cost of \$22.20. The wild Ribes were confined to a few concentrations along the stream courses.

Two commercial nurseries have applied for pine shipping permits under regulations of Federal Quarantine No. 63. The necessary control work in the environs of these nurseries will be performed during the spring of 1933.

Black Currant Eradication

Survey of black currants made during 1928 in Morris County, also in parts of Monmouth and Sussex; 102 plantations of black currants were located in Morris County, 19 in Monmouth, 10 in Sussex, 1 in Warren, and 1 in Passaic Counties. In the area scouted, black currants were found in only one nursery. There is an unwritten agreement between the New Jersey nurseries not to sell these bushes. No systematic eradi-

White Pine Production Conditions

White pine in New Jersey in 1911 on which the Forest Service has been working. Since that time, the Forest Service has been working in the state every year with exceptions of 1912, 1914, 1915, 1923, and 1929. According to 1927 census the disease more generally prevalent than ever before, being found on pines in 15 localities in seven counties. No time limitation has been reported since 1915.

Policy

Prior to 1929, all white pine plantations in this state were conducted by the Forest Service, and during the summer months, on about 1000 to 1500 acres of land, a permanent agent has been employed on a part time basis. Due to the limited amount of active white pine, the activities are confined chiefly to nursery sanitation, plant control eradication, inspection and protection of plantations, seedling, and direction of control work where needed.

Inspection and Service Activities

No complete records are available of such activities performed by the Forest Service.

Sanitary White Pine Production Work

No white pine eradication work has been performed in the state except that done around the state nursery at Washington Crossing during 1912. The results of this work are summarized under "Nursery Sanitation".

Nursery Sanitation

In addition to the state nursery at Washington Crossing, there are 85 commercial nurseries growing white pine. Only 25 of these private nurseries contain 500 or more trees of this species.

The initial eradication of white pine in the one white pine plantation some 1000 acres in size was completed in 1912 when 1025 white pine seedlings and 49 cultivated bushes were removed at a total cost of \$22.20. The white pine were confined to a few concentrations along the stream course.

Two commercial nurseries have applied for the same white pine eradication work in the summer of 1912. The necessary control work in the summer of 1912.

Black Current Production

Survey of black current was made during 1923 in Morris County, also in parts of Somerset and Warren; 102 plantations of black current were located in Morris County, 5 in Somerset, 10 in Warren, and 1 in Franklin Counties. In the area located, black current was found in only one nursery. There is an estimated 1000 of black current in the New Jersey nurseries and in all these nurseries. No eradication work-

cation of *Ribes nigrum* in the state has been attempted to date, but the owners of such *Ribes* have in a good many cases destroyed their bushes.

Plantations

About 10,000 acres have been planted; however, the white pine survey shows only an estimated total of 194,840 planted white pines exclusive of 21,388 reported in nurseries. The largest white pine plantings are located in Gloucester, Morris Cumberland, Ocean and Somerset Counties. Smaller white pine plantings are found in the Counties of Monmouth, Warren, Burlington, and Sussex. During 1929, an inspection was made of the sites and environs of the white pine plantings made from stock distributed during that year by the State Department of Conservation and Development. These locations were examined for wild and cultivated *Ribes*, and when *Ribes* and older pines were found nearby, these were inspected for infection. Owners, in each case, were advised regarding the disease and control methods. The plantations varied from 500 to 10,000 seedlings; and on 30 sites examined, 323 cultivated currants and gooseberries (mostly red currants) were located - none of these bushes were infected. Card and map records of this work were kept for future reference. Blister rust control literature is now sent to each purchaser of white pine planting stock from the state nursery.

Ribes Compensation

No compensation has been paid for the few cultivated *Ribes* destroyed in the state.

Surveys and Investigations

Prior to 1929, general scouting during summer months by one or two cooperative scouts to locate pine, *Ribes* and infection - state-wide survey of forest types, by towns, made by Hirt during 1927. The details of the black currant survey conducted during 1928 are given under "Black Currant Eradication". Survey of pine and *Ribes* growing nurseries made in 1931.

Total Cost of All Blister Rust Control Work, 1925-1932, Inclusive

State Blister Rust Appropriation Funds	Other State Appropriation Funds	Federal \$ for \$ Expenditures	Total
\$7,222.89	\$22.20	\$5,596.80	\$12,841.89

The total expenditures for all control work include cost of administration, supervision, blister rust control agent activities, nursery sanitation, field investigations, and miscellaneous.

Future Work

Application and maintenance of adequate nursery sanitation measures - complete survey of *Ribes nigrum* and eradication of such bushes - eradication of all *Ribes* within at least 900 feet of pine plantations and ornamental pine of value - additional scouting in northern section of state to determine in more detail pine, *Ribes* and infection conditions - adequate records and maps to show location of pine plantations, *Ribes nigrum*, native pine, infection, etc. - general informational work to keep public advised regarding the disease and its control.

cation of Ribes nigrum in the state has been attempted to date, but the owners of
such Ribes have in a good many cases destroyed their bushes.

Plantations

About 10,000 acres have been planted; however, the white pine survey shows
only an estimated total of 14,000 planted white pine acres exclusive of 31,122 reported
in nurseries. The largest white pine plantations are located in Clatsop, Lewis
and Clark, Coos and Clatsop Counties. Another white pine plantation was found in
the County of Clatsop, near Warrenton, in 1929, an inspec-
tion was made of the trees and portions of the white pine plantation were from stock
distributed during last year by the State Department of Conservation and Development.
These locations were examined for wild and cultivated Ribes, and when Ribes and other
ones were found nearby, these were inspected for infection. Others, in some cases,
were subject to various diseases and control methods. The plantations varied from
500 to 10,000 seedlings; and on 30 sites examined, 325 cultivated currants and goose-
berries (mostly red currants) were located - none of these bushes were infected. Care
and records of this work were kept for future reference. Ribes root control
literature is sent to each purchaser of white pine planting stock from the state
nursery.

Ribes Compensation

No compensation has been paid for the few cultivated Ribes destroyed in the
state.

Surveys and Investigations

Prior to 1929, general scouting during summer months by one or two cooperative
agents to locate Ribes and infection - state-wide survey of forest types, by
towns, made by first during 1927. The details of the black currant survey conducted
during 1928 are given under "Black Currant Investigation". Survey of pine and Ribes
growing nurseries made in 1931.

Total Cost of All Ribes Root Control Work, 1925-1932, Inclusive

State Ribes Root Investigation Funds	Other State Appropriation Funds	Federal Aid for Investigation	Total
\$1,252.03	\$52.40	\$5,250.00	\$6,554.43

The total expenditures for all control work include cost of administration,
supervision, direct root control agent activities, survey, sanitation, field investi-
gations, and miscellaneous.

Future Work

Application and maintenance of adequate nursery sanitation measures - complete
survey of Ribes plants and eradication of same by other - eradication of all Ribes within
at least 200 feet of the plantations and commercial sites of white - additional scouting
in certain sections of state to determine in some detail pine, Ribes and infection con-
ditions - adequate records and maps in each location of Ribes plantations, Ribes nigrum.

BLISTER RUST CONTROL IN PENNSYLVANIA

Acreage and Commercial Value of White Pine

	Acreage	Value
Pure white pine (80-100%) - {Over 6" DBH.....	51,854	\$ 5,807,648.
(Under 6" DBH.....	40,043	1,021,075.
Mixed white Pine - {21-29% pine in mixture.....	98,023	2,744,644.
{30-79% pine in mixture.....	28,078	1,572,368.
Other types with scattered white pine stocking and restocking*.....	157,630	{1,103,410.-Pine stocking { 157,630.-Restocking
White pine restocking in pure merchantable and mixed white pine types.....	68,662**	68,662.
Totals.....	375,628	\$12,475,437.

*Excludes those "other types" which have 1-20% pine (above restocking size), but do not contain white pine restocking.

**This acreage not included in total, as it is already listed under pure and mixed.

Basis for estimating value of white pine: merchantable stumpage figured at normal value of \$7 per M - average volume per acre, pure merchantable white pine = 16 M bd.ft.; mixed white pine, 21-29% = 4 M bd.ft.; mixed white pine, 30-79% = 8 M bd.ft.; and white pine, above restocking size in other types = 1 M bd.ft. Pure stands of white pine under 6" DBH given normal value of \$25 per acre. Estimated normal per acre value of white pine restocking: degree of restocking, light = \$1, medium = \$2, heavy = \$3.

Stumpage prices under present abnormal conditions range from \$2 to \$6 per thousand board feet. This is, however, a temporary situation which should return to normal when economic conditions improve.

Ribes Conditions

Wild Ribes are generally abundant throughout the entire state, the principal species being Ribes rotundifolium which occur in heavy concentrations in many locations.

Pine Infection Conditions

The disease was discovered on white pine in Pennsylvania in April, 1905, by Samuel N. Baxter at a nursery in Dresher near Philadelphia. This is the earliest known record of blister rust being found in this country. It was not until 1909 that another infection was reported in the state - one infected white pine (imported from Europe) was found at Lewiston Junction by J. F. Collins. Subsequent discoveries of blister rust were reported in various counties in Pennsylvania from 1910-1926, chiefly on planting stock imported from European countries. Intensive scouting since 1926 has revealed that the rust on pine and Ribes is quite generally distributed, and at the present time is known to be present on pine in 35 of the 67 counties in the state.

The disease was discovered on white pine in Pennsylvania in 1905, by Samuel M. Foster at a nursery in Reading near Philadelphia. This is the earliest known record of blister rust being found in this country. It was not until 1909 that another infection was reported in the state - one infected white pine (imported from Europe) was found at Lewistown Junction by J. E. Bellamy. Subsequent discoveries of blister rust were reported in various counties in Pennsylvania from 1910-1920, chiefly on planting stock imported from European countries. Intensive reporting since 1926 has revealed that the rust on pine and fir is quite generally distributed, and at the present time is known to be present on pine in 25 of the 67 counties in the state.

Policy

Prior to 1929, the work was limited chiefly to scouting for pine, Ribes and infection during the summer months by one or two temporary men employed cooperatively by the State and Federal Departments of Agriculture. The first demonstrations of control methods were held during 1928 by the Department of Forests and Waters in cooperation with the Division of Blister Rust Control. In 1929, the work was organized on the following cooperative basis: The State Department of Agriculture agreed to assume administrative direction of cooperative employees, conduct such control activities as agreed upon each year by the cooperating parties, and to enforce state laws under which blister rust control is conducted. The Department of Forests and Waters agreed to undertake the application of local control measures on state owned forests; cooperate with counties, towns, associations, and individuals in the application of local control measures and provide supervision and checking of such work. In 1930, the Department of Forests and Waters took over the responsibility, through its state blister rust leader and district foresters, of directing all control activities in the state. Most of the Ribes eradication work during 1929 and all that done in 1930 was performed on state lands. Such state work was continued during 1931 and 1932. In addition during these two years, a few temporary agents were employed during the summer months to conduct control work in cooperation with individual owners. These agents did the necessary scouting for Ribes and assisted owners by supervising the eradication of concentrations of such bushes on their properties.

Informational and Service Activities of Blister Rust Control Agents

No complete records of such activities prior to 1932 are available. During that year, 3,479 publications were distributed, 76 posters and signs placed, blister rust news items were published in 26 newspapers, and talks were given at three meetings attended by 103 persons. In addition, two radio addresses were given over Station WBAK at Harrisburg.

A total of 414 individuals were interviewed for the first time, and 364 follow-up calls were made.

Individual Cooperation in Blister Rust Control Work 1929-1932 Inclusive

Individual cooperation in Ribes eradication work was secured during 1929, 1931, and 1932 when 216 owners expended \$1,270.69 in eradicating Ribes from their properties.

Results of Regular Ribes Eradication Work, 1929-1932, Inclusive (Initial and Re-eradication)

	Acreage Worked	Ribes Pulled		Cost				Per Acre	
		Wild	Cult.	State	Indiv.	Govt.	Total	Cost	Ribes
Regular Cooperative Work	64,211	2,596,423	5,468	\$28,387.82	\$1,270.69	\$1,031.20	\$30,689.71	.478	40.4
Allegheny National Forest	1,057	117,443	8	-	-	635.69	635.69	.601	11.1
Total	65,268	2,713,866	5,476	\$28,387.82	\$1,270.69	\$1,666.89	\$31,325.40	.480	41.6

Prior to 1952, the work was limited chiefly to recording for time, place and inter-
n during the summer months by one or two temporary and voluntary cooperatively by the
in and Federal Department of Agriculture. The first demonstration of control methods
a field guide 1952 by the Department of Forestry and Nature in cooperation with the
State of Bihar Forest Control. In 1952, the work was organized on the following
basis: The State Department of Agriculture agreed to assign administrative
section of cooperative employees, conduct such control activities as survey work and
by the cooperative parties, and to release state law enforcement officers to assist in
that is conducted. The Department of Forestry and Nature agreed to maintain the
location of local control measures on state owned forests; cooperative also conduct
re, associations, and individuals in the collection of local control measures and
village organization and conduct of such work. In 1950, the Department of Forestry and
and took over the responsibility, through its state forest and district
offices, of conducting all control activities in the state. Part of the Bihar evan-
gelist were done in 1950 and all that done in 1950 are performed in state lands. Such state
work continued during 1951 and 1952. In addition during these two years, a few
forest agents were employed during the summer months to conduct control work in co-
operation with individual owners. These agents did the necessary scouting for Bihar and
later were by maintaining the eradication of concentrations of such places on their
parties.

International and Service Activities of Bihar Forest Control Agents

of complete records of each activities given to 1952 are available. During that
time, 7,175 publications were distributed, 70 posters and signs placed, Bihar forest news
were published in 26 newspapers, and talks were given at these meetings attended
157 persons. In addition, two radio addresses were given over Bihar State at Gwalior.

A total of 14 individuals were interviewed for the first time, and 364 follow-up
interviews were made.

Individual Cooperation in Bihar Forest Control Work
1952-1953 Inclusive

Individual cooperation in Bihar eradication work was resumed during 1952, and
in 1953 when the amount expended \$1,270.69 in eradicating Bihar from their groups.

Summary of Annual Bihar Eradication Work, 1952-1953, Inclusive
(Initial and Re-eradication)

Area	Total	Initial	Re-eradication	Total	Cost	Per Acre
Barh	54,811	2,105,475	128,787.52	11,270,601.07	649.71	4.75
Barh	1,007	11,103	-	672.52	170.68	1.71
Barh	5,713,666	128,787.52	11,270,601.07	128,787.52	1,270.69	1.27

This summary excludes nursery sanitation work during the period 1930-1932, inclusive, when a separate record was kept of such activities.

The cost of the regular Ribes eradication project includes owners' labor (valued at 40 cents per hour) and all expenditures for wages of laborers, scouts and foremen employed in locating and pulling Ribes.

A small amount of control work was done prior to 1929 in connection with the protection of three state nurseries. This project was begun in 1924 at the Clearfield nursery, and in 1926 and 1928 this area was reworked. In 1927, the Greenwood and Mount Alto nurseries were initially protected. During 1928, three small demonstrations of control work were given by Federal men for the benefit of members of the State Department of Forests and Waters. Acreage, Ribes, and cost data are not available for the work prior to 1929.

Results of First Re-eradication of Ribes, 1931-1932

	Acreage Reworked	Ribes Pulled		Cost				Per Acre	
		Wild	Cult.	State	Indiv.	Govt.	Total	Cost	Ribes
Regular Cooperative Work	3,375	83,122	7	\$2,657.59	\$18.60	\$ 4.20	\$2,680.39	\$.794	24.6
Allegheny National Forest	461	13,321	-	-	-	213.39	213.39	.463	28.9
Total	3,836	96,443	7	\$2,657.59	\$18.60	\$217.59	\$2,893.78	\$.754	25.1

No direct comparison is practicable between the per acre cost of the re-eradication work and the corresponding cost of all Ribes eradication since there is a variation in the acreage involved and in the sites examined. Most of the re-eradication work has been in areas where crew work was required.

Status of Regular Ribes Eradication Work - December, 1932

Total Acreage of Control Area	Acreage of Control Area Worked		Acreage of White Pine		Est. Acreage of White Pine Protected		Est. Percentage Control Area Worked*		Acreage Still in Need of Protection	
	Initial Erad.	Re-erad.	Total in State	Total in Control Area	Initial Erad.	Re-erad.	Initial Erad.	Re-erad.	Initial Erad.	Re-erad.
544,995	61,432	3,836	375,628	217,998	24,573	1,534	11.3	0.7	483,563	541,159

*The percentages are the same for the pine area protected in the control area.

The total control area includes the acreage initially cleared of Ribes to date and the estimated acreage still in need of initial protection. The control area was estimated to be composed of 40 per cent pine acreage (pure pine and mixed 21-79 per cent) and 60 per cent protection zones. The pine acreages protected and the acreage still in need of protection were figured on this basis.

own employer in locating and drilling Nibed.
 (cost at 10 cents per hour) and all expenditures for wages of laborers, security and
 The cost of the regular Nibed eradication project includes owners' labor

1960.

Results of first re-examination of Rides

Year	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100
1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067	2068	2069	2070	2071	2072	2073	2074	2075	2076	2077	2078	2079	2080	2081	2082	2083	2084	2085	2086	2087	2088	2089	2090	2091	2092	2093	2094	2095	2096	2097	2098	2099	2100	

No direct comparison is practicable between the per cent cost of the re-education work and the corresponding cost of all other education since there is a variation in the scope involved and in the sites examined. Most of the re-education work has been done in areas where crop work was required.

Nursery Sanitation

Nursery sanitation has been restricted to four state nurseries located at Clearfield, Greenwood, Mount Alto and Rockview. Ribes eradication work was first conducted around the Clearfield nursery in 1924. During 1926, a re-examination was made within a 900 foot protection zone. The area was again reworked in 1928 including all white pine plantations in the vicinity of the nursery and for a distance of 900 feet beyond the plantings. In 1927, initial control work was performed at the Greenwood and Mount Alto nurseries. Acreage, Ribes, and cost data are not available for the work done prior to 1930. During 1930, all three state nurseries were re-eradicated of Ribes and protected by 1500 foot sanitation zones. The sanitation zones at the Greenwood and Mount Alto State nurseries were again re-examined in 1932, and a zone was also partially established around the Rockview Frison nursery.

Results of Ribes Eradication Work in Connection with Nursery Sanitation Project (1930-1932, Inclusive)

Type of Work	Acreage Worked	Ribes Pulled		Total Cost	Per Acre	
		Wild	Cult.		Cost	Ribes
Initial eradication	895	9,303	52	\$ 588.43	.657	10.4
Re-eradication	1,161	13,127	0	635.11	.547	11.3
Total	2,056	22,430	52	\$1,223.54	.595	10.9

These data are not included in the regular Ribes eradication summaries.

During 1933, a survey will be made to determine the amount of white pine in the various commercial nurseries. The cooperation of the nursery owners will be solicited in establishing sanitation zones, when the amount of existing pine stock justifies the application of such control measures. According to available information, the amount of white pine in the commercial nurseries is very limited and grown entirely for ornamental purposes.

Black Currant Eradication

Cultivated Ribes survey made in Wayne County in 1925 - 279 black currants being found. General scouting and the school campaign show Ribes nigrum planted in most sections of the state, but these bushes are apparently not very numerous. During 1929, a few black currants were eradicated on private lands adjoining state forests which were cleared of wild Ribes. Due to the small number of black currants found near the white pine areas, it may be possible to eradicate such bushes in conjunction with the regular control work and thus eliminate a special black currant project.

Cultivated Ribes Compensation

No compensation has been paid for the 5,528 cultivated Ribes destroyed during the period 1929-1932.

Summary Statistics

Summary statistics have been reported to local state universities located at Clark, Greenwood, Mount Zion and Rockwell. Since eradication work was first conducted around the Chesapeake Bay in 1924, during 1925, a re-examination was made within 100 foot protection zone. The area was again surveyed in 1926 following all white the plantations in the vicinity of the nursery and for a distance of 100 feet beyond the plantation. In 1927, initial control work was continued at the Greenwood and Mount Zion nurseries. Acrocyx, Stictix and other data were not available for the white origin in 1930. During 1930, all three state nurseries were re-examined for Stictix and Acrocyx. The eradication zones at the Greenwood and Mount Zion nurseries were again re-examined in 1931, and a zone was also partially established around the Horseshoe River nursery.

Summary of Stictix Eradication Work in Connection with Nursery Station Project (1925-1931, Inclusive)

Type of Work	Average Number	Stictix Killed		Total Cost	Cost per Tree
		White	Black		
Initial eradication	225	9,303	2	\$1,688.45	10.4
Re-examination	1,161	13,127	0	\$222.11	11.7
Total	2,036	22,430	2	\$1,910.56	10.9

These data are not included in the regular Stictix eradication summary.

During 1931, a survey will be made to determine the amount of white pine in the various commercial nurseries. The cooperation of the nursery owners will be solicited in re-examining eradication zones, when the amount of white pine stock justified the application of such control measures. According to available information, the amount of white pine in the commercial nurseries is very limited and would entirely for ornamental purposes.

Black Current Eradication

Cultivated Black Current survey was in Wayne County in 1925 - 1926 under contract being made. General summary and the school committee have been advised in West Virginia of the state, but these figures are suggestive not very accurate. During 1929, the Black Currents were eradicated on private lands adjoining state forests and the cleared of wild Black. Due to the small number of Black Currents found near the state pine areas, it may be possible to eradicate such bushes in conjunction with the regular control work and this eliminates a special Black Current project.

Cultivated Black Current Eradication

No eradication was made in 1930 and 1931. The 1930-1931 summary is as follows:

Surveys

During 1927, a cooperative school survey resulted in the rust being found on Ribes in 37 counties in an area extending nearly to the Ohio border on the west and on the south to the Maryland line. In 1928, a somewhat similar infection survey was conducted by utilizing the forest fire warden personnel (4,100 men) of the Department of Forests and Waters. Reports were received from 171, or 4 per cent of the men, scattered over 50 of the 53 counties in the state. A total of 91 wardens submitted 269 Ribes specimens, 14 of which were infected with the rust. During 1929, another Ribes infection survey was carried on by the Department of Forests and Waters through their field personnel numbering about 150 men. As a result blister rust was found in 15 locations in 11 counties, in all of which infection had been previously reported.

A detailed white pine survey of the state was begun in January, 1931. This work is being performed by the blister rust control personnel with the assistance of the field personnel of the Department of Forests and Waters. At the end of 1932, the project had been completed in 25 counties and 9 additional counties partially surveyed.

Investigations

In the spring of 1932, two pine infection study plots were established in Union and Pike Counties. These plots will be re-examined periodically to determine the progress of the disease and the effectiveness of the control work performed. Later in the year, two salvage study plots were established in heavily infected plantations in the same two counties. The purpose of these plots is to determine if it is possible and economically feasible to salvage selected final crop trees by pruning and releasing, and then cutting out any blister rust cankers remaining after these operations.

Total Cost of All Blister Rust Control Work, 1925-1932, Inclusive (Not including Federal control project at Allegheny National Forest)

State Blister Rust Appropriation Funds	Other State Appropriation Funds	Individual Funds or Labor	Federal \$ for \$ Expenditures	Total
\$47,019.97	\$300.82	\$1,270.69	\$27,098.33	\$75,689.86

The total expenditures for all control activities include cost of administration, supervision, blister rust control agent activities, Ribes eradication, eradication assistants, nursery sanitation, field investigations, and miscellaneous.

Future Work

Complete initial control work on 483,563 acres - estimated on basis of total acreage pure and mixed (21-79 per cent) pine plus an additional acreage for protection zone equivalent to 60 per cent of pine acreage minus acreage of initial eradication completed to date - re-examination of control areas that have not been re-eradicated - 541,159 acres - establish and maintain sanitation zones around all important pine growing nurseries - eradication of Ribes nigrum within important white pine growing section of state - continuation of field studies.



REPORT OF COOPERATIVE BLISTER RUST CONTROL
WORK IN THE SOUTHERN APPALACHIAN REGION.

1932.

By
Roy G. Pierce,
Associate Pathologist.
April 7, 1933.

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1

ANNUAL REPORT ON BLISTER RUST CONTROL IN SOUTHERN APPALACHIAN REGION.

Early Work

Period 1910 to 1927

Some scouting for the blister rust was undoubtedly carried on in this region prior to 1916 for the blister rust was reported from Virginia in 1911 by Spaulding in Department of Agriculture Bulletin 957, Investigations of the White Pine Blister Rust (See fig. 5, page 8). In the period from 1916 to 1920 scouting for the rust was carried on in Maryland, Virginia, West Virginia, North Carolina, Tennessee and Kentucky in general under a cooperative agreement with the states concerned, but without finding any signs of the rust. No attempt was made to secure Ribes eradication at this time. Much valuable data on location of white pine and Ribes is to be found in these early reports. From 1921 to 1927 inclusive no work was carried on in the district as far as I can ascertain from the files.

Period 1928 to 1931

From 1928 to 1931 inclusive extensive scouting for the disease was carried on in Maryland and northern parts of Virginia and West Virginia. In 1930 scouting by Cope extended also to North Carolina, Georgia, Tennessee and Kentucky. As a result of the scouting by L.W. Hodgkins and C.T. Geiser in 1931 the blister rust was found in the three southern states at 5 or 6 centers in western Maryland, at 2 centers in West Virginia and at 2 centers in Virginia.

Beginning also in 1928 preeradication surveys for Ribes were carried out in the Natural Bridge National Forest, George Washington National Forest in Virginia and West Virginia and in the Monongahela National Forest in West Virginia. In 1929 nursery sanitation began around the Forest Service Nursery at Parsons, W.Va. and has continued each year to date. Beginning in 1928, 2631 Ribes have been removed in the vicinity of the Parsons nursery including 125 cultivated bushes. The total area worked approximates 549 acres. An area of 2000 acres was scouted for Ribes nigrum - but no bushes of this species have ever been found within one mile of the nursery.

On the George Washington National Forest the writer with the assistance and cooperation of the Forest officers has carried on extensive Ribes eradication and surveys for pine and Ribes. A total of 39,334 Ribes have been removed from this forest to date, from 5008 acres, 1040 acres of this area has been worked twice. The writer has in the first 2 or 3 years acted as foreman of the crew that pulled the Ribes. In 1931 and 1932 the Forest Service has been carrying on the eradication, while I have made the preeradication surveys and have checked up on the eradication work. A preeradication survey was also carried on in 1929 and 1931 by the writer in company with C. T. Geiser and forest officers. Ribes were found only in two locations close to white pines. Ribes eradication prior to 1932 was carried on by Mr. F.F. Nicola at his estate Rock Lodge near Thayerville in Garrett County, ^{Md} Mr. Nicola had planted 58,250 white pines by 1929 according to Mr. John R. Curry. Mr. Curry writes in 1929 of Nicola's white pines "These plantations are extensive and formerly the Ribes was very common. Eradication has been practiced in recent years but specimens may still be found on the area."

Summaries of Work Carried on in 1932.

The following tables have been prepared.

Table 1. Control work on State and Federal forest nurseries.

Table 2. Blister Rust Control outside of nurseries.

Table 3. Preeradication survey, area eliminated by scouts.

Table 4. Preeradication survey, Ribes present, area not eliminated by scouts.

Expenditures, July 1, 1932 to Dec. 31, 1932.

State	Authorization under agreement*		Expended under agreement		Total expended by Federal and State agencies
	Federal	State	Federal	State	
Maryland	\$1,000	\$1,000	\$512.89	\$500	\$1,012.89
North Carolina	1,000	100	512.89	100	612.89
Virginia	1,000	100	512.89	148.23	661.12
West Virginia	1,000	100	512.90		
Total	4,000	1,300	2,051.57		

*For fiscal year 1933.

1890

Foreword.

No cooperative agreement exists between the Federal government and state for blister rust control.

Acreage of White Pine

No data available from the Forest Service. Up to 1932, this Division had no knowledge of there being native white pine in the State. One native stand of mixed white pine, loblolly pine and hardwood about 8 acres in extent was seen by the writer in Kent County 3 miles west of Harrington in company with State Forester, W.S. Taber and Mr. R.A. Sheals. The owner is Mr. W. Sapp. There is a second stand in Essex County of unknown extent.

White Pine Plantations.

The State Forester distributed 9,000 white pines from the State Forest Tree Nursery in 1931 near Lincoln in Sussex County. No white pines were reported as distributed by State Forester for period 1926 to 1930 inclusive.

Ribes Eradication. None.

Black Currant Elimination

Scouting for rust was carried on by Mr. R.A. Sheals of Bureau of Plant Quarantine and the writer on September 27, 28 and 29, 1932, particular attention being paid to Ribes nigrum.

Collins Nursery at Milford, Sussex County formerly (about 1916, '17) had 100 R. nigrum. They went out of business years ago.

Eugene DuPont at Centerville listed as formerly having 20 black currants destroyed them, has no Ribes now.

Lamont DuPont of Wilmington has perhaps 80 red currants and gooseberries but no black currants.

Alfred I. DuPont of Wilmington has formerly had 48 nigrum according to records has none now.

Edward Brighurst near Shellpot Park, Wilmington formerly had 6 black currants, but has none now.

The only location known to have had black currants in 1916 which we did not visit was at Mrs. Addick's Claymont Newcastle. Records show 5 black currants.

The estates visited above got rid of their black currants years ago, I believe, because of educational work carried on by Federal and State governments.

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The Agricultural Experiment Station at Newark destroyed about 20 Ribes nigrum within the past year according to Mr. J.F. Adams, the State Plant Pathologist. All R. nigrum were supposed to have been destroyed at this time, but 10 Black Champions (R. nigrum) were still in the row at the station at time of our visit. In addition there were 150 red currants and 100 cultivated gooseberries. Attention was called to Mr. J. F. Adams concerning these black currants. Mr. D.C. Kenning is local manager of the Experiment Station.

Blister Rust Survey.

In addition to places visited, listed above under Black Currant Elimination the following inspections were made for rust:-

F.W. Pickard, Greenville, Newcastle County	33 red currants
R.C. Pierce, Shipley Road, Edgemoor near Bringhurst Estate	31 red currants 8 gooseberries
Mrs. Stirlith Route 13, 3 mi. north of Wilmington	6 gooseberries
Del-Mar-Va. Nursery, Lincoln, adjoining State Forest Tree Nursery	15 "
Home of Fraternal Order of Red Men, Newark	8 red currants 18 cultivated gooseberries
State Senator Drexler at "Burwood" Camden 1½ miles north of Viola on Rte. 113	16 cultivated gooseberries

A total of 525 currants and gooseberries were examined at 8 places, but without finding any signs of the blister rust.

Nursery Sanitation

The State Forest Tree Nursery at Lincoln has no Ribes on the premises, but there are 15 cultivated gooseberries at the Del-Mar-Va. Nurseries, (E.L. Lynch, Prop.) adjoining the State Nursery and within 1500 feet of it.

The Del-Mar-Va. Nurseries are growing some white pine. The matter of disposal of the 15 cultivated gooseberries at Mr. Lynch's place has been taken up with State Forester Taber and Plant Pathologist Adams. No action has been reported to me, however.

Ribes Distribution

Ribes floridum (American black currant) is native in the state being listed by Edward Tatnoll in 1860 as being present near Riddles in Newcastle County, in his "Catalog of the Phaenogamous and Filicoid Plants of Newcastle County, Delaware.

5

Nurseries growing White Pines.

State Forest Nursery, Lincoln
Del-Mar-Va. Nurseries "

10,000 P. strobus
Several hundred P. strobus

Guyencourt Nurseries, Guyencourt - -

P. strobus

Future Work

In the fall it is planned to scout for blister rust near Lincoln, Guyencourt, Newark and Newcastle and around native pine stands in Kent and Essex Counties.

RGP:cjp
4/13/33

MARYLAND

Policy

The policy this year has been that of getting acquainted with the blister rust problem, of getting the white pine nurseries both state and private protected from the rust, and of getting under way the pine and Ribes survey beginning with the important State and municipal forests.

Acreage of White Pine

According to the latest estimate, made by Mr. J.A. Cope in August, 1930 there are 15,000 acres in the state where white pine runs 5% or better of the area; viz.

Allegany County	- - - -	6,000	acres
Garrett	" - - - -	8,000	"
Washington	" - - - -	1,000	"

In the eastern counties, no exact figures are available but data from State forester's office together with data in blister rust files would indicate the following as conservative:

Frederick County	- - - -	100	acres
Baltimore	" - - - -	500	"
Montgomery	" - - - -	30	"
Other counties	- - - -	50	"
Total	- - - -	680	"

This would give a grand total of 15,680 acres of white pine.

Stand of White Pine

The U. S. Forest Service estimated January 1, 1932 that there were 5,000 cords of white pine on cordwood areas, equivalent to 2,500,000 feet of saw timber worth at \$2.50 per cord \$12,500.00. Sawtimber was estimated in millions of feet and no figures were given for Maryland.

Cooperation

The State Horticultural Department and the State Department of Forestry are cooperating with the U. S. Department of Agriculture in this control work, the State agreeing to expend about \$1,000 and the Federal Government about \$1,000. *Fed. exp. \$12.89, State exp. 500; Total \$ 1012.89*

Ribes Eradication - None.

Black Currant Elimination.

This Division has carried on no such project - but in the vicinity of J.H. Small's Nursery at Norbeck the only cultivated black currants (4 in number) within one mile of the nursery were destroyed by the owner this past summer.

1. The first part of the paper discusses the importance of maintaining accurate records of all transactions.

2. The second part of the paper discusses the importance of maintaining accurate records of all transactions.

3. The third part of the paper discusses the importance of maintaining accurate records of all transactions.

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Plantations

Planting of white pine is not carried on in the State on a large scale, from 10,000 to 60,000 trees of this species being distributed annually by the State Forester from his nursery. From 1918 to 1923, the white pine represented 47% of all species distributed. In the last four years 1928, to 1931 inclusive the per cent of white pine fell to 7.5, 8.1, 4.9, and 8.2 respectively. 40,000 white pine were planted in 1931 from State Forester's nursery. From 1918 to 1931 inclusive, the State nursery distributed 352,375 white pines, which is 13.4% of all species distributed in that period.

The largest plantations are on the Baltimore watershed on the Gunpowder River north of Loch Raven. 381,650 white pines have been planted along the Gunpowder, the plantings dating back to 1912. The State has made several small plantations of white pine on State land, viz.:

Fort Frederick at Big Pool 7,800 trees on $9\frac{1}{4}$ acres beginning in 1921.

Herrington Manor on Swallow Falls State Forest 8 acres.

Brier Ridge " " " " " $2\frac{1}{2}$ "

No Ribes were found at the above 4 plantations though all were inspected carefully in fall of 1932. A complete list of white pine plantations made with State forest nursery stock is on hand.

Nursery Sanitation.

Nursery sanitation has been carried on in connection with the State Forest Nursery at Lakeland near College Park, 3 Ribes plantings out of 5 being destroyed, and at J.H. Small & Sons, Norbeck Nursery at Norbeck and A. Gude & Sons Nurseries at Ashton and at Derwood near Rockville. Gude has received a permit from the Bureau of Plant Quarantine, the gooseberries which were present near the Ashton nursery area having been destroyed. The regulation forming control areas in Maryland which the State authorities are contemplating will take care of the remaining two small plantings of Ribes near the State forest nursery. The nursery sanitation work was carried on in cooperation with Dr. G.S. Langford, State Nursery Inspector and Prof. C.E. Temple, State Plant Pathologist.

Ribes Survey.

Five native species of Ribes have been reported in the State, viz.,
Ribes americanum American black currant from Prince Georges and Garrett County. This species is also found under cultivation at Geo. Turner's 4 miles east of Grantsville in Garrett County.

Ribes cynosbati - pasture or prickly-berried gooseberry from Allegany, Frederick and Garrett Counties.

Ribes glandulosum from Garrett County along the Youghiogheny River.

Ribes rotundifolium - roundleaf gooseberry from Frederick, Garrett, Prince Georges and Washington Counties.

Ribes triste - Wild red currant from Garrett County.

While Ribes hirtellum has been reported by Jno. R. Curry from several counties and by myself from Garrett County, their identification has not been approved by Dr. Coville, Botanist of the Department. The ordinary red or white garden currant is sometimes found escaped from cultivation, and growing in a wild state.

While Ribes have been found in the past at low elevations in the State, that is, from 100 to 200 feet elevation in the vicinity of Washington, both americanum and rotundifolium were said to be infrequent in Prince Georges County, scouting carried on in the northern tier of Counties by Geiser and Pierce in 1928 and 1929 and by Hodgkins and Geiser in 1931 revealed no signs of wild Ribes until the Catoctin Mountains were reached. Ribes cynosbati and rotundifolium are present in the Catoctins in Frederick County and in the adjoining South Mountain in eastern Washington County. Then jumping the lower levels of Washington County, proceeding west, some rotundifolium have been reported from Pigskin Ridge in the western part of County. In Allegany County Ribes are reported from Flintstone and Martin Mountain and Wills Mountain near Cumberland and at Carlos Junction while in Garrett County at the extreme western edge of State, Ribes are reported from numerous sections; from Big Savage Mt. Keyser Swallow Falls, Hutton, East of Oakland at Nicolas Rock Lodge near Thayerville on Back Bone Mountain 2 miles east of Redhouse and on same Mountain between Bloomington and Deer Park and at other places.

Many localities in which Ribes are abundant are lacking in white pine and vice versa.

At the suggestion of Mr. Besley Ribes survey was carried on in the Green Ridge State Forest in Allegany County and in the Swallow Falls State Forest in Garrett County. No Ribes were found in the former, though considerable pine were located, and in the latter forest, Ribes were found at Swallow Falls but not close to the pine plantations at Herrington Manor or on Brier Ridge.

Ribes rotundifolium and some cynosbati were found abundantly one mile below Lantz at an elevation of about 1000 feet in Frederick County, R. rotundifolium was abundant on road south of Pen Mar to High Rock at 1500 to 1800 feet and in Warren Gap and Raven Rock Hollow, at 1200 and 1100 feet, all in South Mountain in Washington County. Proceeding west through Washington, Allegany and Garrett Counties wild Ribes (rotundifolium) were again located 6 miles east of Hancock on Pigskin Ridge in western Washington County one mile east of Flintstone at 800 feet elevation west slope of Martin Mountain, 4 miles west of Flintstone in Allegany County.

THE UNIVERSITY OF CHICAGO
DEPARTMENT OF CHEMISTRY
CHICAGO, ILLINOIS

TO THE HONORABLE SENATE OF THE UNIVERSITY OF CHICAGO
FOR THE DEGREE OF DOCTOR OF PHILOSOPHY
IN THE FIELD OF CHEMISTRY

BY
[Name]
[Address]
[City, State, and Zip]
[Country]

Submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

This dissertation is dedicated to my family and friends.

I wish to express my appreciation to my advisor, [Name], for his guidance and support throughout this work. I also wish to thank my committee members, [Name] and [Name], for their helpful suggestions and criticisms. Finally, I wish to thank my friends and family for their encouragement and support.

Pine Survey

A beginning has been made in surveying the State for white pine. White pine stands of saw timber size are much smaller and scarcer than formerly, due to lumbering, fire and perhaps to insects.

The survey carried on in 1932 included the Baltimore watershed on the Gunpowder River, a small plantation of the Emmitsburg Watershed above Loch Raven State plantings at Fort Frederick and the Green Ridge and Swallow Falls State forests. The Maryland Forest Service has rendered considerable aid in this survey.

Future Work

Nursery sanitation work is contemplated around the Towson Nursery - at Towson in Baltimore County, and will be carried on in March. Location of white pine and Ribes in three western counties and mapping their distribution on U.S.G.S. sheets will be continued during the year.

Cooperative eradication of Ribes had already been arranged with Mr. J.H. Hughes of Hutton, and with Mr. A.L. Sine, Resident Forest Warden of Oakland for work on the Auxiliary State Forest at Swallow Falls. Ribes scouting will be carried on in the vicinity of the extensive pine plantations along the Gunpowder River in Baltimore County and around the nurseries of Small and Gude in Montgomery County, and the State forest nursery in Prince Georges County.

Blister Rust Distribution

The first blister rust was found in Maryland on July 16, 1931 by Mr. S. B. Detwiler. In 1931 blister rust was found in two counties as follows: In Allegany County the rust was found at 2 centers, five infections at one center, and one infection at the other center; in Washington County the rust was found at 5 centers, two places at 2 centers, and one place for each of the three centers. All of the infections were on Ribes except near High Rock where the disease was also found on 1 white pine. In 1932 the rust was found at one center one mile south of Frostburg on black currants, at two places where it had been located the previous year.

The first part of the report deals with the general situation of the country and the progress of the work during the year.

The second part of the report deals with the results of the work during the year and the progress of the work during the year.

CONCLUSION

The third part of the report deals with the results of the work during the year and the progress of the work during the year.

The fourth part of the report deals with the results of the work during the year and the progress of the work during the year.

The fifth part of the report deals with the results of the work during the year and the progress of the work during the year.

Informational Activities

Blister rust specimens were shown to nurseries of J. H. Small & Sons and A. Gude & Sons, whose headquarters are in Washington. Danger from blister rust was explained to 50 persons in vicinity of Small's and Gude's Nurseries. Miscellaneous Publication #22 was left with 8 persons.

Nurseries Growing White Pine

The following is a partial list of nurseries in Maryland growing white pine:

State Forest Nursery, College Park -	42,000	P. strobus
J. H. Small & Sons, Norbeck, Md. -	3,808	" "
" " " No. Chevy Chase, Md. -	37	" "
Quaintacres, Silver Spring, Md.	135	" "
A. Gude & Sons, Ashton & Rockville, Md. -	5 or 6 acres	"
Silver Spring Nurseries -		
(Proprietors, R. S. McCeney & E. E. Ruppert)	6	P. strobus
Towson Nurseries, Towson, Md.	100	" "
" " Ashland, Md. -	4,576	" "
Towson's Boxwood Nursery near Cockeysville -	30	" "

White Pine Lumber Production *

1925.	2,450,000	Ft. B.M.
1926.	519,000	Ft. B.M.
1927.	715,000	" "
1928.	1,315,000	" "
1929.	886,000	" "
1930.	483,000	" "

* The above figures are from bulletins of the U. S. Dept. of Commerce, Bureau of the Census.

The following information is for your information only. It is not intended to be used as a basis for any action. The information is for your information only. It is not intended to be used as a basis for any action.

SECTION 1: GENERAL INFORMATION

The following information is for your information only. It is not intended to be used as a basis for any action. The information is for your information only. It is not intended to be used as a basis for any action.

Item 1	Item 2	Item 3	Item 4	Item 5
1.1	1.2	1.3	1.4	1.5
2.1	2.2	2.3	2.4	2.5
3.1	3.2	3.3	3.4	3.5
4.1	4.2	4.3	4.4	4.5
5.1	5.2	5.3	5.4	5.5
6.1	6.2	6.3	6.4	6.5
7.1	7.2	7.3	7.4	7.5
8.1	8.2	8.3	8.4	8.5
9.1	9.2	9.3	9.4	9.5
10.1	10.2	10.3	10.4	10.5

SECTION 2: SPECIFIC INFORMATION

Item 1	Item 2	Item 3	Item 4	Item 5
1.1	1.2	1.3	1.4	1.5
2.1	2.2	2.3	2.4	2.5
3.1	3.2	3.3	3.4	3.5
4.1	4.2	4.3	4.4	4.5
5.1	5.2	5.3	5.4	5.5
6.1	6.2	6.3	6.4	6.5
7.1	7.2	7.3	7.4	7.5
8.1	8.2	8.3	8.4	8.5
9.1	9.2	9.3	9.4	9.5
10.1	10.2	10.3	10.4	10.5

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U. S. DEPARTMENT OF AGRICULTURE

DIVISION OF PUBLICATIONS



November 1, 1914

THE NORRIS PETER CO. WASHINGTON, D. C.

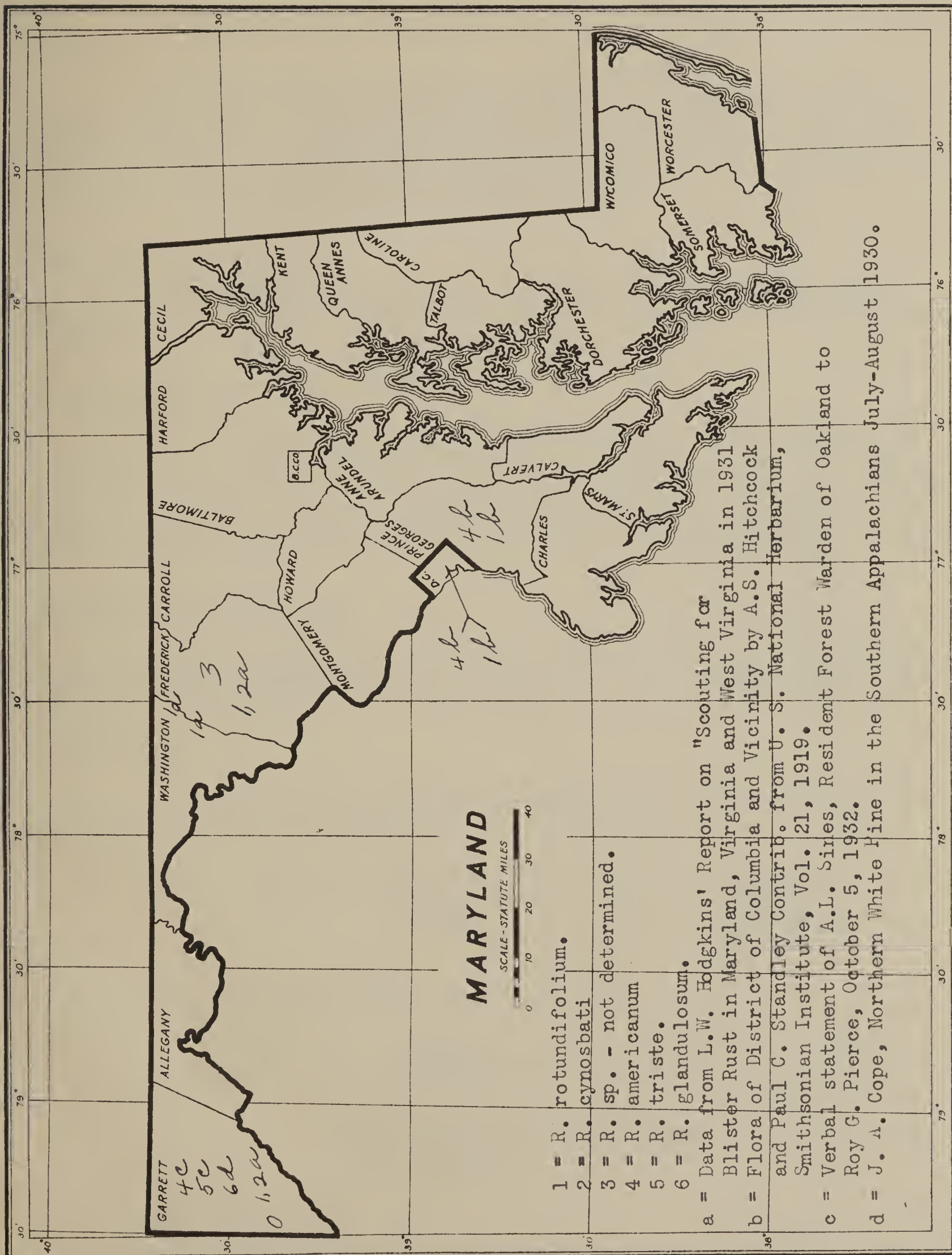
Acres as given in J. A. Cope's 1930 Report for 3 western counties.

Acres in other counties estimated from data in Division of Blister Rust Control.

R.G.P. 1/11/33

U. S. DEPARTMENT OF AGRICULTURE

DIVISION OF PUBLICATIONS



November 1, 1914

Oakland

THE MORRIS PETER CO., WASHINGTON, D. C.



NORTH CAROLINA

Policy

Since no blister rust has been found in the State up to the end of 1932, the work of Ribes eradication has not been pushed. Rather the policy has been one of getting acquainted with the problem, of making contact with State and Federal officials and of making a beginning in pine location. This has been carried on since July 1.

Acreage of white pine

There is 256,000 acres of white pine of which it is estimated 90,000 acres or 16.38% are in National Forests and 166,000 acres in private ownership.

Stand of white pine

According to the U.S. Forest Service there is 40 million ft. B.M. old growth saw timber, and 20 million ft. B.M. second growth saw timber, making a total of 60 million ft. B.M. of merchantable timber. In addition there are 240,000 cords of cordwood on cordwood areas, equivalent to 120 million ft. B.M. Combining the saw timber and cordwood, would give a total of 180 million feet.

Lumber Production in 1930

The lumber production in 1930 was 7,149,000 ft. B.M. and average production 1925 to 1928 incl. was 5,316,000 ft. B.M; average value f.o.b. mill in 1930: \$26.68 per M. Total value f.o.b. mill in 1930 \$190,735

Cooperation

No funds have been expended for eradication, Federal funds were expended in travel and scouting and in office work.

Federal expenses credited to North Carolina.

Salary - - - - -	\$230.58	} 512.89
Expenses - - - - -	56.70	
Total - - - - -	\$447.08	

State expenses credited to control work.

Salary - - - - -	} 100.00
Expenses - - - - -	

Total Federal and state salary
and expenses.

\$ 612.89

Ribes Eradication: None.

Black Currant Elimination: None.

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National Forests

The Forest Service estimated in 1930 that there were 9,829,000 feet of merchantable timber in the National Forests in North Carolina; viz. the Pisgah, the Nantahala and the Cherokee. The Pisgah has about 60,000 acres in white pine running 50% or better; and the Nantahala 30,000 acres in white pine. White pine has been planted on 166.5 acres in the national forests of the State.

Plantations

A considerable acreage has been planted to white pine particularly on the Biltmore Estate where this species was the chief one planted. Plantings here date back 40 years and amount to 3,000 acres. Old records in the Washington Office from 1917 and 1918 list an additional 56.8 acres of white pine plantation at 10 different places in western North Carolina. The main centers for planting up to 1918 seem to have been Buncombe County at Asheville, Biltmore and Black Mountain; Macon County at Highlands and Watauga County at Blowing Rock; plantations or windbreaks were seen by Pierce in 1932 at Lenoir in Caldwell County, at Linville in Avery County. Other counties having plantations of which this office has a record include, Davie, Henderson, Jackson, Moore and Transylvania. No thorough scouting of plantations has been carried on since 1918. The State forester has distributed in the 4 years 1928-1931 a total of 16,800 white pines. These pines, however, were not listed in the state forest nursery but were, I am informed, purchased from the Champion Fibre Co. of Canton. A record of the places to which these pines were shipped is being sent from the State Forester's office.

Nursery Sanitation

According to the accompanying list of North Carolina nurseries having white pine none grow any Ribes. This list was furnished by the State Entomologist, Dr. R.W. Leiby, October 15, 1932. The Champion Fibre Co. of Canton seems to be growing the largest number of pines.

NURSERIES HAVING WHITE PINES OR RIBES ON PREMISES

<u>Name</u>	<u>Address</u>	<u>County</u>	<u>No. of white pines</u>	<u>No. of Ribes</u>
Wayside Nursery	Biltmore	Buncombe	Less than 50	None
Liberty Street Nur.	"	"	" " "	"
C.D. Beadle Nursery	"	"	100 or more	"
Nettlewood Nurseries	"	"	Less than 50	"
Tandy Nurseries	Skyland	"	" " "	"
R.S. Steadman	Hendersonville	Henderson	" " "	"
Poinsett Gardens	Zirconia	"	" " "	"
Carolina Nursery	East Flat Rock	"	" " "	"
Champion Fibre Co.	Canton	Haywood	Several beds of seedlings and some larger trees.	
Blue Ridge Nursery	Marion	McDowell	Less than 50	None
Gardens of Blue Ridge	Ashford-Pineola	Avery	100 or more	"
Anthony Lake Nursery	Pineola	"	50-100	"

NURSERIES HAVING WHITE PINES OR RIBES ON PREMISES (Cont'd)

<u>Name</u>	<u>Address</u>	<u>County</u>	<u>No. of white pines</u>	<u>No. of Ribes</u>
Watauga Nurseries	Shulls Mills	Watauga	50-100	None
Wildwood "	Blowing Rock	"	Less than 50	"
Valdesian "	Boxtic	Rutherford	50-100	"
Green Hill Nursery	Rutherfordton	"	Less than 50	"
Mecklenburg "	Charlotte	Mecklenberg	" " "	"
Harky Bros. Nursery	"	"	" " "	"
Steele Creek "	"	"	" " "	"
L.A. Reynolds "	Winston-Salem	Forsyth	" " "	"

Ribes Survey

Studies of the distribution of the native Ribes in the State made by Mr. Paul V. Siggers in 1917 and by Mr. J.H. Cope in 1930 and checked up by an examination of Ribes specimens in the herbarium of the University of North Carolina, show that few if any native species occur below 3500 feet elevation. Since a considerable portion of the white pine in the State exists below 3500 feet elevation this indicates that the problem of blister rust control is below this elevation; not one dealing with native species but is a problem of the cultivated species.

In the short period I was in the State this past summer I could make no widespread study of the cultivated gooseberries and currants. However, I found cultivated Ribes in quantity on the Biltmore Estate at Biltmore and at Mrs. Moses H. Cone's at Blowing Rock and several escaped or abandoned cultivated gooseberries at Black Mountain adjoining Major H.H. Wilson's place.

Perusal of Mr. Sigger's "Report on Blister Rust - Inspection in the South," dated August 1, 1917, shows that 1088 cultivated Ribes were present at 55 places located in 16 different cities and towns. This would indicate that the cultivation of these bushes was quite general in the mountainous section of the State, and it is the elimination of these around valuable pine stands which will present one of the problems in blister rust control.

Mr. Sigger's list of locations of cultivated gooseberries and currants follows:

<u>County</u>	<u>Town or Location</u>	<u>No. Ribes</u>	<u>No. places</u>
Avery	Linville	67	3
Buncombe	Asheville	171	8
"	Biltmore	10	1
Caldwell	Lenoir	5	2
Henderson	Flat Rock	20	1
"	Hendersonville	2	1
Jackson	Cashiers	137	7
Macon	Highlands	243	12
"	Short Off	20	1
Rowan	Salisbury	3	1
Transylvania	Pisgah Forest	18	1
Watauga	Blowing Rock	227	11
"	Boone	23	2
"	Grandfather Mt.	1	1
	Jerusalem	102	1
	16 places	1088	55



Ribes Survey (Cont'd)

Mr. Paul V. Siggers wrote in 1917 in his "Report on Blister Rust Inspection in the South":

Ribes in North Carolina.

Ribes are likely to be found where the white pine is found. This is so because red currants and gooseberries were cultivated to a considerable extent 15 or 20 years ago. At the present day although the currant worm has brought the cultivation of Ribes into disfavor, the bushes will be found if carefully searched for.

Wild Ribes are found in the mountain sections of the State. Two species are known to occur. Ribes cynosbati is reported Harbinson as occurring in all mountainous sections above 4000'. I saw it at two places near Blowing Rock. It was also reported from Whiteside Mountain and the lower falls of the Cullasaja River. Ribes rotundifolium, a species of gooseberry with a more restricted range has been found by Harbinson in the Balsam and Black Mountains. I found a little growing on Grandfather Mountain between 5000' and 6000' elevation. I regard it as growing in a belt above that of native white pine. It is in no sense abundant.

As found by Mr. J.A. Cope in 1930, Ribes are not found at the lower elevations in the mountains and foothills, but are confined to the higher elevations. Cope's records of Ribes follows:

R. rotundifolium. Yancey Co. Summit of Mt. Mitchell 6720 ft.

None found below 3,000 ft. in North Carolina.

R. glandulosum Yancey Co. Mt. Mitchell in red spruce zone.

R. cynosbati - Watauga County near Grandfather Mountain, one bush found in the State. Elevation of 3500. "This species is apparently very infrequent."

A record of the Ribes found in the State was secured from the herbarium of the University of North Carolina at Chapel Hill.

Ribes cynosbati - Ashe County - Negro Mt.

" " - Haywood Co. - Cold Mt.

" " - Mitchell Co.

" " - Yancey Co. Mt. Mitchell - Elevation 6,200 ft.

" " - " " $\frac{1}{2}$ mile above Escota on Chase River.

Ribes rotundifolium - Yancey Co. - top of Black Mountain in small openings of spruce forest $\frac{1}{4}$ mile south of Mt. Mitchell.

" " Mitchell Co.

Ribes prostratum - Watauga Co. Grandfather Mountain, elevation 5,800 ft.
(syn. glandulosum)

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R. prostratum - Yancey Co. Mt. Mitchell, Elevation, 6,200 ft.

My two records supplement the above.

Ribes cynosbati on Mt. Pisgah probably in Buncombe County. - Numerous half way up mountain and within 300 feet in elevation of top at about 5,300 feet elevation. No white pine were found nearby.

R. rotundifolium at Blowing Rock, Watauga County, 1 bush at Mrs. Moses H. Cone's place, elevation about 3,814 feet. Large plantation of white pine nearby.

No Ribes were found by myself in or near white pine stands at Lenoir Caldwell County or between North Wilkesboro and Boomer in Wilkes County or in vicinity of Asheville or Biltmore in Buncombe County or between Asheville and Hendersonville, near Halls Mill in Wilkes County or south of Sparta in Alleghany County.

Supervisor John B. Byrne of the Nantahala National Forest under date of December 31, 1932 writes "As far as we know there is no native Ribes within the Nantahala." In letter of December 15, 1932, he writes concerning the acreages in the forest by states "which include all areas purchased or which are under purchase agreement.

South Carolina . . .	48,950 acres
Georgia	140,009 "
North Carolina . . .	159,500 "
	<u>348,459</u>

Blister Rust Survey

A search was made for the rust from September 1 to 7, 1932 in the following counties without locating any signs of the disease: Alleghany, Buncombe, Caldwell, Guilfort, Henderson, Watauga, Wilkes and Yadkin.

Future Work

It is planned to carry out pine and Ribes survey in the white pine sections of the State; to scout those sections of the National Forests at such elevations that Ribes and pine may be growing in close proximity, with the aim of securing pine protection through Ribes eradication in the near future; to visit Champion Fibre Co. Nursery at Champion in Wilkes County, the largest white pine growing nursery in the State, and other pine growing nurseries and study Ribes situation in their vicinity, and to conduct a blister rust survey in the fall.

Informational Activities

A complete set of available blister rust publications was sent the Director of the Appalachian Forest Experiment Station at Asheville. Specimens of the rusted white pine and Ribes were sent Mr. Mattoon, Supervisor of the Pisgah National Forest at Asheville for the education of his rangers. The District Forester, Mr. W. K. Beichler with headquarters at Asheville was given specimens of the prickly-berried gooseberry (R. cynosbati) as well as a bush known locally as southern or wild gooseberry one of the Viburnums.

Specimens of blister rust on pine (5 test tubes) and Ribes (7 window envelopes) were sent to Dr. R. W. Leiby, State Entomologist on Dec. 28, 1932.

Specimens of blister rust on pine (6 test tubes) and on Ribes, 4 Riker mounts and one window envelope were sent to Forest Supervisor M. A. Mattoon of the Pisgah National Forest at Asheville for distribution to his local forest officers.

TENNESSEE

Pine and Ribes Surveys

No work was carried on in the State in 1932 or since Cope made his survey in 1930. Previous to Cope's visit the most extensive survey for white pine and Ribes was carried out in 1919 by Prof. Alban Stewart (a botanist then teaching at the Florida State College for Women). He spent 8 weeks in the summer of 1919 scouting in the State. His report of 74 pages (filed under 88.1, Tenn. Reports 1919) is of greatest value in any consideration of our work in Tennessee. Summarizing the situation he writes on pages 2, 3 and 4:

"After having spent some eight weeks in the white pine regions of the state, I think that the pine of the state is practically safe from the blister rust, this safety being due to the fact that Ribes occur but rarely."

* * * * *

"It seems to me that it is unnecessary to continue further scouting for white pine in the state, as the map which accompanies this report is, I believe, as accurate as could be made under the circumstances. I do not believe that it is worth while to scout further for Ribes alone as it occurs so seldom. I believe that one is apt to find isolated localities in almost any part of the higher mountain ranges which may contain more or less Ribes, but locating such is all but impossible without the expenditure of more time and money than the work justifies. It is likely, if another summer were spent in scouting for Ribes alone, a few more localities would be found, but it is not at all likely that Ribes and white pine would be found growing close enough to each other for the Ribes to prove a menace to the pine. If further scouting for Ribes is contemplated, I would suggest that larger herbaria of the country be searched for specimens of Ribes from Tennessee before the work is started. Localities where Ribes grow can be located in this way. To start out to hunt Ribes in this state, with no clue as to where to look would be a most discouraging undertaking.

"Due to the lack of Ribes, it seems that Tennessee would be an excellent place in which to strongly encourage the reforesting of areas with white pine. The growth is more rapid here than in the north and the quality of lumber produced is very good in most places. Should the blister rust finally get beyond control in the northern white pine regions, and should finally exterminate what little white pine is left there, the southern mountains will be a second line of defense for the growth of white pine in this country."

Cope's notes on Ribes in Tennessee in his report on "Northern White Pine Southern Appalachians," on page 40 filed 86.22(Cope, 1930).

"The writer did not see a single wild Ribes bush in Tennessee. In line with the general altitudinal distribution of Ribes in the states to the north, it was not anticipated that any Ribes would be found in the white pine zone. Nevertheless diligent search was made, particularly in Unicoi County and again in Polk County, in the white pine areas."

"Text books on the flora of Tennessee report that Ribes cynosbati is to be found at high elevations in the great Smokies. This statement was confirmed by Dr. Essary, a distinguished botanist at the University of Tennessee, at Knoxville, who had found it above 4,000 feet on Clingman Dome and other peaks. None of the forest officers on the Cherokee or Unake forests had ever seen Ribes in the white pine zone. Dr. Essary is extremely familiar with the Cumberland Plateau and has botanized all over it. He reports that no Ribes occur on this plateau.

"If white pine could only be made as safe from fires in Tennessee as it is from blister rust, then its future would indeed be bright. The weevil is no more a problem here than it is in southwest Virginia."

White Pine

The Forest Service in January 1932 estimated that there were 114,000,000 feet of white pine sawtimber in the State. This is worth at \$6.86 per M (the average annual stumpage price for period 1923-30 according to R.E. Marsh of U.S.F.S.) \$782,040.00. In addition the Forest Service estimated that there were 66,000 cords of white pine on cordwood areas which at \$1.75 per cord would be worth ~~\$658,000.00~~ ^{\$115,500.00}. The cordwood converted into ft. B.M. would be equivalent to 33,000,000 ft. The combined value of merchantable white pine timber and cordwood on cordwood areas is \$897,540.00 and the stumpage is 147,000,000 feet B.M.

National Forests

There are three national forests in Tennessee: the Unaka, Pisgah and the Cherokee. It is estimated that 18,000 acres on the Pisgah in Tennessee have white pine (from 5% of stand up), and 100,000 acres on the Cherokee. There is considerable white pine on the Unaka but I have received no estimate of acreage as yet.

The Forest Service has estimated that there is 42,461,000 feet of merchantable white pine timber on the federally owned lands in Tennessee valued at \$291,292.00. Most of this is within the national forests, though a very small amount of pine is said to exist in the Great Smoky National Park.

National Parks

Cope writes in 1930 concerning the white pine in the Great Smoky National Park (p. 37a, 38) "The writer did not make a personal inspection of the forest areas within the Great Smokies National Park because he was told by foresters (Vernon Rhodes, Superintendent of the Great Smokies National Park for North Carolina), and lumbermen familiar with the region that there were no areas within the Park where white pine now occupied as much as 5% of the area. Reports of several large lumbering operations in both Sevier and Blount Counties indicated that the original stands contained considerable white pines."

Work Planned for 1933

At the request of the Forest Service I am planning on a trip to the Unaka National Forest before July 1 to inspect for Ribes two large planting sites, one on Laurel Fork in Carter County and a second on Dicks Creek and adjacent areas, tributary to North Indian Creek in Unicoi County.

Am also planning on a trip to the Great Smokies National Park which lies in North Carolina as well as in Tennessee. Mr. Kemmerer, Associate Chief of National Park Service will give me a letter of introduction to the Superintendent of the Park.

Additional surveys will be conducted in the state for Ribes.

Nurseries

The following is a partial list of nurseries growing white pines:

Sweetwater Valley Nursery, Sweetwater, Tenn.	P. stroubs,	Probably for ornamental pur- poses.
Howell Nursery Knoxville, Tenn.	" "	Probably ornamental
State Forester, Nashville		Forestry.

White Pine Lumber Production *

1925	9,749,000	Ft. B.M.
1926	5,600,000	" "
1927	4,302,000	" "
1928	4,746,000	" "
1929	7,138,000	" "
1930	5,112,000	" "

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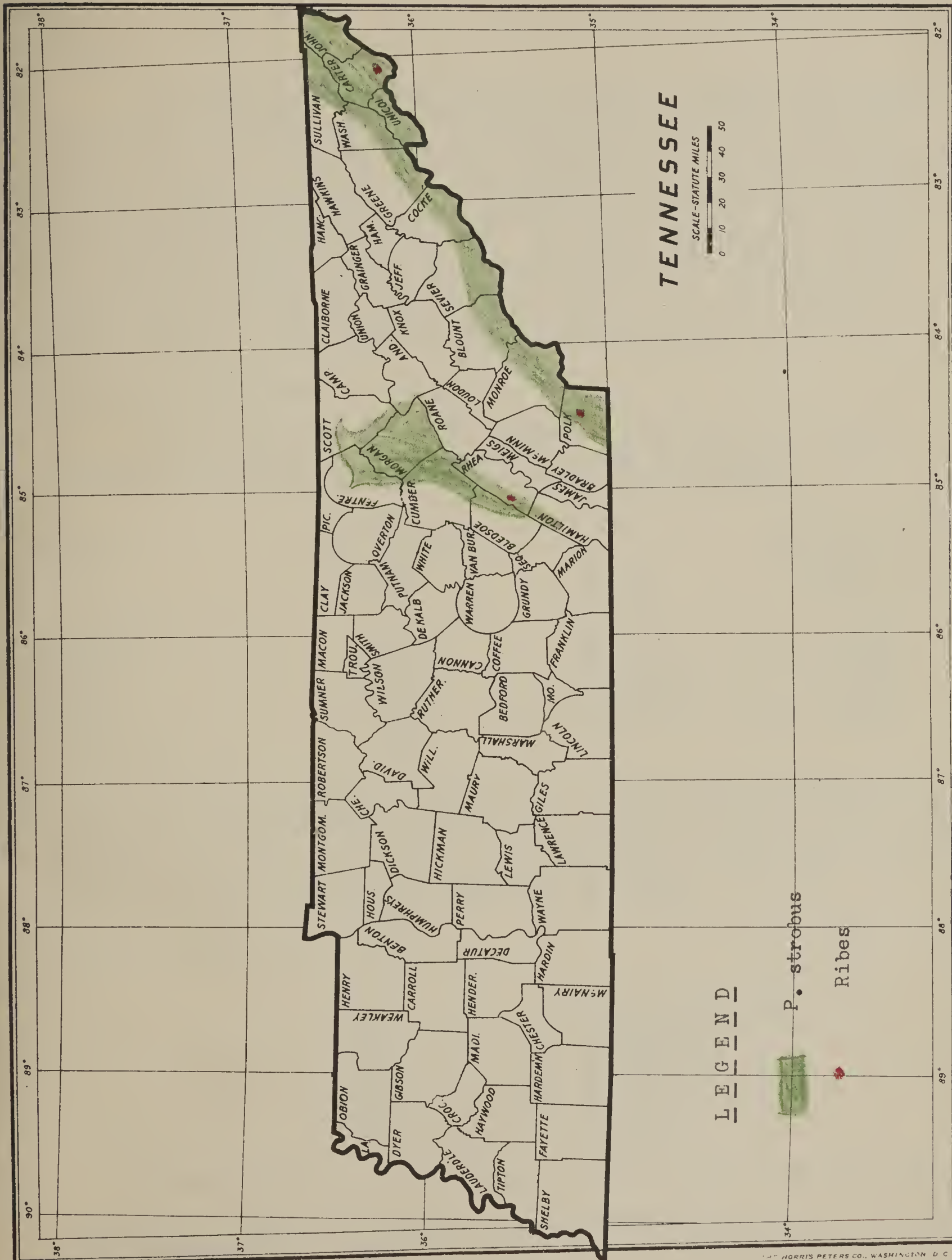
* The above figures are from bulletins of the U. S. Dept. of Commerce, Bureau of the Census.

DISTRIBUTION OF NATIVE WHITE PINE AND RIBES IN TENNESSEE ACCORDING TO 1919 SURVEY BY ALBAN STEWART.

U. S. DEPARTMENT OF AGRICULTURE

DIVISION OF PUBLICATIONS

DISTRIBUTION OF NATIVE WHITE PINE AND RIBES IN TENNESSEE ACCORDING TO 1919 SURVEY BY ALBAN STEWART



Policy

The State has made available for the work of 1932-33, \$100 while the Federal Government has allotted \$1,000.00 for the work. The Virginia Forest Service and the Virginia State Entomologist are now cooperating in the work. Mr. Willey of the State Entomologist's office has cooperated with the writer in making a survey in northern Virginia at two different periods, once for the blister rust and the second time for white pines in the Shenandoah National Park area. No formal cooperation in control was carried on before July 1, 1932 though surveys and eradication have been carried on on the George Washington National Forest since August 1928; and on the Natural Bridge National Forest since 1929. The work on these forests is found under section "National Forests."

Acreage of White Pine

According to Mr. J.A. Cope's report in 1930 there are 233,000 acres on which white pine constitutes 5% or more of the stand. Adding to his data we find the following area in white pine by counties:

<u>County</u>	<u>Acres in white pine 5% or better</u>	<u>County</u>	<u>Acres in white pine 5% or better</u>
Alleghany - - - - -	9,000	Carroll - - - - -	75,000
Amherst - - - - -	8,000	Floyd - - - - -	35,000
Augusta - - - - -	18,000	Highland - - - - -	12,000
Bath - - - - -	28,000	Rockingham - - - - -	25,000
Bland - - - - -	8,000	Wythe - - - - -	11,000
Botetourt - - - - -	4,000		

Of this area it is estimated that there are 85,441 acres in National Forests in the State constituting 36.67% of the white pine area in the State. In addition to these 11 counties there are a number of other counties with probably less than 1,000 acres of native white pine in each, viz: Albemarle, Frederick, Page, Rappahannock, Shenandoah and Warren.

White Pine Lumber Production*

1925 - - - - -	11,233,000	Ft.	B.M.
1926 - - - - -	5,195,000	"	"
1927 - - - - -	3,683,000	"	"
1928 - - - - -	6,137,000	"	"
1929 - - - - -	6,418,000	"	"
1930 - - - - -	9,820,000	"	"

*Figures according to U. S. Dept. of Commerce, Bureau of the Census.

The white pine lumber cut of 1930, 9,820,000 feet at \$26.68 per M. ft. was worth \$261,997,60 f.o.b. mill.

Stand of White Pine

According to Forest Service statistics there are 69 million feet of white pine sawtimber and 376,000 cords of white pine on cordwood areas in Virginia. The cordwood is estimated at 2 cords per M feet to be the equivalent of 188 million feet. The stand of sawtimber and cordwood would thus total 257 million board feet.

The sawtimber is estimated as worth - - -	\$473,340
And the cordwood " " " -- - -	658,000
The total value thus being - - - - -	<u>1,131,340</u>

Cooperation

Since July 1, 1932 the State has expended \$ 148.23 in connection with our work and the Federal Government ~~\$512.89~~. This work included nursery sanitation, nursery inspection, preeradication surveys, inspection of eradication work and general scouting for the rust. *Total exp. #661.12*

Ribes Eradication

This was carried on largely on the George Washington National Forest but also by the City of Harrisonburg. The following table shows the eradication carried on in the calendar year 1932.

National Forests

There are three National Forests wholly or in part within the State, namely the George Washington (formerly the Shehendoah), Natural Bridge and Unaka. There are white pine stands in each forest. The Forest Service estimated as of January 1, 1932 that there were 25,302,000 ft. B.M. of saw timber federally owned and this amount is probably all within the National Forests. The saw timber valued at \$6.86 per M. (the average price for stumpage for the period 1923-30 inclusive) is worth \$173,572.00. In addition there is to my knowledge considerable cordwood on cordwood areas. The amount of cordwood in the National Forests has not been estimated.

Ribes eradication was begun in the George Washington National Forest in 1928 and it has been carried on each year since. A total of 39,334 Ribes have been removed in this National Forest from 5,008 acres 1,014 acres of this area have been worked more than once. 342 Ribes were removed from 10 acres on the Natural Bridge National Forest. For detailed statement of bushes pulled each year and the different areas worked see under the heading "Ribes eradication" on preceding pages. The Forest Service believes in the future of white pine in the State and in its timber sales makes provision for leaving seed trees, and small merchantable pine. Bare areas are being reforested and white pine is one of the species used. The following record of white pine plantations was secured from the Forest Service.

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Section 1

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<u>Year</u>	<u>Geo. Washington National Forest</u>	<u>Natural Bridge National Forest</u>
1917		24 acres
1921		2 " **
1926	22 acres	
1927	1 "	
1928	3.6 " *	
1929	41.63 " *	
1930	37.35 " *	
1931	69.83 " *	37.81 acres*
1932	(30.00 "	
	(11.50 " *	

*Other species have been planted with white pines in a mixed plantation.

**Failed - trees apparently pulled up after being successfully established. The 1931 planting was used to fill in failures of tree set out prior to 1930. Many of the trees planted in 1930 died on account of the drouth. These were replaced in 1932. As far as I know there has been no planting of white pine on the Unaka Forest in Virginia.

Plantations

The Virginia Forest Service has been distributing white pines for plantation purposes since 1921, and in the 11 year period 1921 to 1931, has distributed from the State Forest Nursery a total of 68,132; of these 100 came to Washington, D.C. and 1024 were shipped to Monongahela National Forest in West Virginia, leaving 67,008 for planting in Virginia. At 1,000 trees per acre, a fair figure, this number of pine would plant about 67 acres.

Nursery Sanitation

The State Forest Nursery at Charlottesville, the only nursery in the State that grows white pine to any extent according to Mr. Willey of Richmond was scouted by Mr. Rufus Maddox and the writer on August 24 and 25. No European black currants were found within one mile radius of the nursery, an area of 2,010 acres being covered, or any wild or cultivated currants or gooseberries within 1500 feet of the nursery. The State nursery had 87,000 white pines in the seed beds and transplant beds at the end of 1932.

Black Currant Elimination

The 4 black currants at the Tulyeries at White Post, adjoining the State's plantation of 5 to 10 acres of white pine were destroyed by the Superintendent, according to letter received from him on November 15.

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1901	1900	1899	1898	1897	1896	1895	1894	1893	1892	1891	1890	1889	1888	1887	1886	1885	1884	1883	1882	1881	1880	1879	1878	1877	1876	1875	1874	1873	1872	1871	1870	1869	1868	1867	1866	1865	1864	1863	1862	1861	1860	1859	1858	1857	1856	1855	1854	1853	1852	1851	1850	1849	1848	1847	1846	1845	1844	1843	1842	1841	1840	1839	1838	1837	1836	1835	1834	1833	1832	1831	1830	1829	1828	1827	1826	1825	1824	1823	1822	1821	1820	1819	1818	1817	1816	1815	1814	1813	1812	1811	1810	1809	1808	1807	1806	1805	1804	1803	1802	1801	1800	1799	1798	1797	1796	1795	1794	1793	1792	1791	1790	1789	1788	1787	1786	1785	1784	1783	1782	1781	1780	1779	1778	1777	1776	1775	1774	1773	1772	1771	1770	1769	1768	1767	1766	1765	1764	1763	1762	1761	1760	1759	1758	1757	1756	1755	1754	1753	1752	1751	1750	1749	1748	1747	1746	1745	1744	1743	1742	1741	1740	1739	1738	1737	1736	1735	1734	1733	1732	1731	1730	1729	1728	1727	1726	1725	1724	1723	1722	1721	1720	1719	1718	1717	1716	1715	1714	1713	1712	1711	1710	1709	1708	1707	1706	1705	1704	1703	1702	1701	1700	1699	1698	1697	1696	1695	1694	1693	1692	1691	1690	1689	1688	1687	1686	1685	1684	1683	1682	1681	1680	1679	1678	1677	1676	1675	1674	1673	1672	1671	1670	1669	1668	1667	1666	1665	1664	1663	1662	1661	1660	1659	1658	1657	1656	1655	1654	1653	1652	1651	1650	1649	1648	1647	1646	1645	1644	1643	1642	1641	1640	1639	1638	1637	1636	1635	1634	1633	1632	1631	1630	1629	1628	1627	1626	1625	1624	1623	1622	1621	1620	1619	1618	1617	1616	1615	1614	1613	1612	1611	1610	1609	1608	1607	1606	1605	1604	1603	1602	1601	1600	1599	1598	1597	1596	1595	1594	1593	1592	1591	1590	1589	1588	1587	1586	1585	1584	1583	1582	1581	1580	1579	1578	1577	1576	1575	1574	1573	1572	1571	1570	1569	1568	1567	1566	1565	1564	1563	1562	1561	1560	1559	1558	1557	1556	1555	1554	1553	1552	1551	1550	1549	1548	1547	1546	1545	1544	1543	1542	1541	1540	1539	1538	1537	1536	1535	1534	1533	1532	1531	1530	1529	1528	1527	1526	1525	1524	1523	1522	1521	1520	1519	1518	1517	1516	1515	1514	1513	1512	1511	1510	1509	1508	1507	1506	1505	1504	1503	1502	1501	1500	1499	1498	1497	1496	1495	1494	1493	1492	1491	1490	1489	1488	1487	1486	1485	1484	1483	1482	1481	1480	1479	1478	1477	1476	1475	1474	1473	1472	1471	1470	1469	1468	1467	1466	1465	1464	1463	1462	1461	1460	1459	1458	1457	1456	1455	1454	1453	1452	1451	1450	1449	1448	1447	1446	1445	1444	1443	1442	1441	1440	1439	1438	1437	1436	1435	1434	1433	1432	1431	1430	1429	1428	1427	1426	1425	1424	1423	1422	1421	1420	1419	1418	1417	1416	1415	1414	1413	1412	1411	1410	1409	1408	1407	1406	1405	1404	1403	1402	1401	1400	1399	1398	1397	1396	1395	1394	1393	1392	1391	1390	1389	1388	1387	1386	1385	1384	1383	1382	1381	1380	1379	1378	1377	1376	1375	1374	1373	1372	1371	1370	1369	1368	1367	1366	1365	1364	1363	1362	1361	1360	1359	1358	1357	1356	1355	1354	1353	1352	1351	1350	1349	1348	1347	1346	1345	1344	1343	1342	1341	1340	1339	1338	1337	1336	1335	1334	1333	1332	1331	1330	1329	1328	1327	1326	1325	1324	1323	1322	1321	1320	1319	1318	1317	1316	1315	1314	1313	1312	1311	1310	1309	1308	1307	1306	1305	1304	1303	1302	1301	1300	1299	1298	1297	1296	1295	1294	1293	1292	1291	1290	1289	1288	1287	1286	1285	1284	1283	1282	1281	1280	1279	1278	1277	1276	1275	1274	1273	1272	1271	1270	1269	1268	1267	1266	1265	1264	1263	1262	1261	1260	1259	1258	1257	1256	1255	1254	1253	1252	1251	1250	1249	1248	1247	1246	1245	1244	1243	1242	1241	1240	1239	1238	1237	1236	1235	1234	1233	1232	1231	1230	1229	1228	1227	1226	1225	1224	1223	1222	1221	1220	1219	1218	1217	1216	1215	1214	1213	1212	1211	1210	1209	1208	1207	1206	1205	1204	1203	1202	1201	1200	1199	1198	1197	1196	1195	1194	1193	1192	1191	1190	1189	1188	1187	1186	1185	1184	1183	1182	1181	1180	1179	1178	1177	1176	1175	1174	1173	1172	1171	1170	1169	1168	1167	1166	1165	1164	1163	1162	1161	1160	1159	1158	1157	1156	1155	1154	1153	1152	1151	1150	1149	1148	1147	1146	1145	1144	1143	1142	1141	1140	1139	1138	1137	1136	1135	1134	1133	1132	1131	1130	1129	1128	1127	1126	1125	1124	1123	1122	1121	1120	1119	1118	1117	1116	1115	1114	1113	1112	1111	1110	1109	1108	1107	1106	1105	1104	1103	1102	1101	1100	1099	1098	1097	1096	1095	1094	1093	1092	1091	1090	1089	1088	1087	1086	1085	1084	1083	1082	1081	1080	1079	1078	1077	1076	1075	1074	1073	1072	1071	1070	1069	1068	1067	1066	1065	1064	1063	1062	1061	1060	1059	1058	1057	1056	1055	1054	1053	1052	1051	1050	1049	1048	1047	1046	1045	1044	1043	1042	1041	1040	1039	1038	1037	1036	1035	1034	1033	1032	1031	1030	1029	1028	1027	1026	1025	1024	1023	1022	1021	1020	1019	1018	1017	1016	1015	1014	1013	1012	1011	1010	1009	1008	1007	1006	1005	1004	1003	1002	1001	1000	999	998	997	996	995	994	993	992	991	990	989	988	987	986	985	984	983	982	981	980	979	978	977	976	975	974	973	972	971	970	969	968	967	966	965	964	963	962	961	960	959	958	957	956	955	954	953	952	951	950	949	948	947	946	945	944	943	942	941	940	939	938	937	936	935	934	933	932	931	930	929	928	927	926	925	924	923	922	921	920	919	918	917	916	915	914	913	912	911	910	909	908	907	906	905	904	903	902	901	900	899	898	897	896	895	894	893	892	891	890	889	888	887	886	885	884	883	882	881	880	879	878	87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Ribes Survey

A survey was carried out in the proposed Shenandoah National Park area particularly in Page, Rappahannock and Warren Counties.

Page County

About 30% of the valleys in Page County within the Park area were scouted by Mr. C.R. Willey and R.G. Pierce in September and November. The area scouted extending from Overall Run on the north to Dry Run next south of Pass Run on the south. No Ribes were found at the lower elevation where most of the white pine is found. Occasional wild Ribes and some abandoned cultivated red currants were found at upper elevations. At Skyland and at numerous other places along the Skyline Drive south of Thornton Gap Ribes were found in abundance. Fortunately valuable white pine are scarce along this drive.

Ribes were also located north of Newmarket Gap on Kerns Mountain in the George Washington Forest, but white pine are absent.

Rappahannock County

Scouting for Ribes has but just started in this county and has included this year only a strip along Skyline Drive south from Thornton Gap. Ribes are plentiful but a good stand of pine was found only in one place.

Warren County

Some scouting was carried on south of Front Royal in the National Park Area but without finding any Ribes bushes. Areas scouted included Gooney's Creek north of Browntown, Middle Branch of Flint Run, Happy Creek and Hominy Creek. Elevations ranged from 700 to 1000 feet.

George Washington National Forest and Adjacent Areas.

Augusta County

Scouting for Ribes was continued on pine growing areas of Taylor Hollow, Kennedy Draft, Hite Hollow, at the Whippoorwill Camp Grounds, North Fork of McKittrick's Branch, Freemason Run and Timothy Hollow, no Ribes being found except at Whippoorwill Camp Ground (which has an elevation of about 2000 feet). Most of the other areas have an elevation ranging from 1600 to 1800 ft.

In the Dry River Ranger District scouting was carried on in Broad Run, Flat Run and Skidmore Run with Ribes found only in the last named. This practically completes the scouting of the lands in the George Washington National Forest which lie in Augusta, Bath and Highland Counties as far as the Forest Service has designated white pine bearing areas. Rescouting in the North River showed Ribes returning between the Shifflett place and Camp Todd. The areas found with Ribes will probably be worked in 1933 by the Forest officers.

There remains in Augusta County a small area in the southern tip of the Shenandoah National Park and in the northern tip of the Natural Bridge National Forest which should be scouted for Ribes if white pine are present.

THE FIRST PART OF THE HISTORY OF THE
REIGN OF CHARLES THE FIRST

IN THE FIRST PART OF THIS HISTORY
WE HAVE SEEN THE KING'S
MARRIAGE AND THE
BEGINNING OF HIS REIGN
AND THE FIRST STEPS
HE TOOK TO REFORM
THE GOVERNMENT OF
THE KINGDOM

IN THE SECOND PART
WE SHALL SEE THE
GROWTH OF THE
PARLIAMENTS

AND THE
DECLINE OF THE
KING'S POWER

UNTIL AT LAST
HE WAS
OBLIGED TO
FLEE THE KINGDOM

AND TO
SEEK ASYLUM
ABROAD

IN THE THIRD PART
WE SHALL SEE
THE
KING'S RETURN
TO ENGLAND

AND THE
END OF HIS REIGN
AND THE
BEGINNING OF
THE COMMONWEALTH

THE SECOND PART OF THE HISTORY
OF THE REIGN OF CHARLES THE FIRST

Rockingham County

Practically all of the white pine area in this County is within the boundary of the George Washington National Forest, but not all of it is federally-owned. There is a large area west of Rawley Springs and a much larger area in Brocks Gap which is in private ownership. Scouting for Ribes in the Forest in this county began in 1929 and has been followed up since then by extensive eradication in Briary Branch and Hone Quarry Run by the Forest Service and in Dry River by the City of Harrisonburg. Scouting was continued this year in several tributaries of Dry River above Rawley Springs, namely Skidmore Fork, Dry Run and Black Run and above Brocks Gap along Shoemaker River, Dry River and Lairs Run. Ribes were found up this latter Dry River and cooperation will be sought here this spring. Considerable Ribes scouting remains to be done in the Brocks Gap area and in the southern part of the proposed Shenandoah Park.

Future Work

A pine and Ribes survey will be continued in the Shenandoah National Park Area, finishing if possible Page County and as much of Rappahannock and Warren County as time will permit. These three northern counties should be worked first since the blister rust has already been found in 1931 in Rappahannock County and in 1932 in Page County.

In the George Washington National Forest the survey for pine and Ribes begun in 1928 will be continued particularly in the Brocks Gap section in Rockingham County and in Shenandoah County.

Parts of the Shenandoah National Park that lie in Madison, Greene and Albemarle Counties should be scouted within the next two or three years but probably cannot be reached in 1933.

Ribes eradication carried on in the spring of 1933 on the George Washington National Forest will be checked later in the season. Additional areas to be planted on this Forest will also be examined this spring, probably in May.

Informational Activities

Three newspaper articles concerning the rust appeared in the Virginia papers, viz., Richmond Times Dispatch of September 30, Richmond News Leader of September 6, and the Page News and Courier of Luray of December 2. In addition the earlier Richmond article was also printed in the Sunday Star of Washington, D.C. about September 11.

Specimens of the rust were given the Virginia Department of Agriculture and Immigration and the Forest Supervisor of the George Washington National Forest. A set of blister rust photographs was sent to Mr. C. R. Willey, Associate Entomologist, at Richmond.

About 40 publications on the rust were given or sent to as many white pine owners in Charlottesville, Rawley Springs, Harrisonburg, Greenwood, White Post in the Shenandoah Park Area near Luray. There were 50 interviews with pine owners and others.

Specimens of the rust were also sent to Dr. S. A. Wingard, Va. Agric. and Mech. College at Blacksburg.

Blister Rust Distribution

The blister rust was first reported by P. Spaulding on planted pine in northern Virginia, either in Clarke or Frederick County in 1911 (U.S.D.A. Bul. 937, p. 8.) Apparently, no spread took place from this location. In 1931 Messrs. Hodgkins and Geiser of this Division discovered the rust in Frederick County near Star Tannery on one Ribes rotundifolium, and in Rappahannock County at Thornton Gap, close to the Rappahannock - Page County line, on numerous Ribes rotundifolium. In 1932 the rust was discovered in Page County for the first time, on 14 cultivated red currants belonging to Mr. L. N. Bryan.

Nurseries

The following list of nurseries which handle white pines was sent me by State Nursery Inspector.

State For. Nursery, Charlottesville, Va.	P. strobus	For forestry purposes
Westcott's Nursery, Falls Church, Va.	" "	Probably ornamental
J.B. Watkins & Bro. Midlothian, Va.	500 trees " "	(Also grows 75 currants or gooseberries)
Alta Vista Nursery Altavista, Va.	P. strobus 1,000 trees	(No Ribes)
Stabler Nursery Fairfax, Va.	Has white pine	
W.E. Showalter Vienna, Va.	P. strobus 100 trees	(Also has 3 or 4 R. odoratum and 3 or 4 gooseberries).

RIBES ERADICATION IN VIRGINIA IN 1932.

County	Location	No. of acres of white pine	No. of acres cleared of white pine	No. of Ribes removed in 1932	Species of Ribes	No. of Ribes removed previously from areas worked in 1932.	Total No. of Ribes removed from lands worked in 1932
Augusta	Geo. Washington Nat. Forest Deerfield Ranger District Holloway Draft, left prong	8	25	418	cynosbati or rotun.	111*	529
	Reuben Drafts, Delta of	2	20	123	" "	49*	172
	Stony Lick Draft	40	40	27	" "	22*	49
	Dry River Ranger District. North River/bound, to Foley place.	20	*	75	" "	67	142
	North River from Shifflett place to first ford above camp Todd.	160	*	96	" "	1367	1463
Rockingham	Skidmore Run including Shifflett Run	37	*	44	" "	0	44
	Puffenbarger Fields	}	}	4392	" "	9	4401
	Run #5 coming in from south between Hawes & Jno. Currey Hollow.			121	" "	0	121
	Hawes Hollow			22	" "	0	22
	John Curry Hollow			606	" "	0	606
Amherst Rockbridge	Hone Quarry Run		600	19,822	" "	5941	25,763
	City of Harrisonburg, Dry River	200	800	10,200	" "	0	10,200
	Natural Bridge National For.						
	Staton's Creek	5	5	326	Rotundi.	0	326
	Irish Creek	5	5	1	" "	15	16
	The Tynleries			4	nigrum	0	4
	Summary for State		2045	36,277		7,581	43,858

*Preliminary scouting, area to be completely worked later.

RIBES ERADICATION IN VIRGINIA 1928-1932.

Number of Ribes Removed

	1928	1929	1930	1931	1932	Total all years
Geo. Washington National Forest	98	1,562	1,730	10,198	25,746	39,334
Natural Bridge "				15	327	342
City of Harrisonburg					10,200	10,200

Black Currant Eradication in Virginia

The Tuyleries					4	4
White Post						
Total Ribes removed all species	98	1,562	1,730	10,213	36,277	49,880

Area Worked (in Acres)

	1928*	1929	1930	1931	1932	Totals
	Init'l.	Reworked	Unitl.	Reworked	Unitl.	Reworked
Geo. Washington National For	1260	0	1600	1513	400	635
Natural Bridge "			*		10	10
City of Harrisonburg					800	800
Totals	1260	0	1600	1513	400	1445
Grand totals					600	5818
						6,832 acres

*Preliminary reconnaissance.



Fine stand of native white pine on George Washington National
Forest near Camp Todd. Taken in 1926. U. S. Forest Service 213213.



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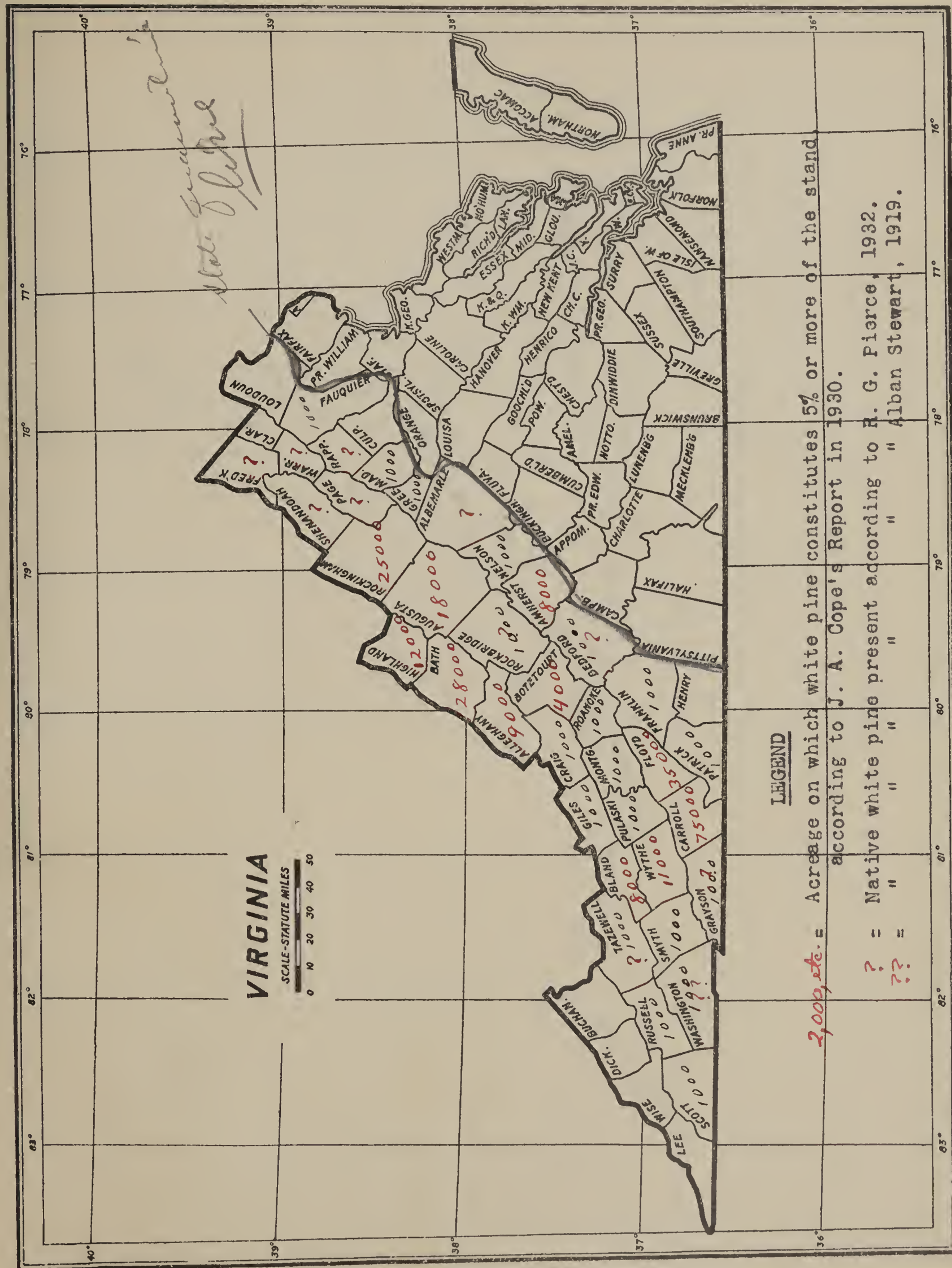


Natural regeneration of white pines by seeding from the side of an old field on the George Washington National Park below Camp Todd. Openings are being filled by plantings. Taken in 1926.

U. S. Forest Service 213211.

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MAP SHOWING WHITE PINE ACREAGE IN VIRGINIA
1932



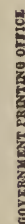


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JAN. 1, 1925



Data from Virginia Forest Service, September 2, 1932.



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WEST VIRGINIAPolicy

The State has made \$100.00 available for the work of the fiscal year 1932-33, while the Federal government has allotted \$1,000.00 for the work in West Virginia. This is the first year in which the State has made a special sum available. Prior to this fiscal year, however, the State Nursery Inspector has been on the lookout each year for the blister rust in the nurseries, and in the past fiscal year the West Virginia Department of Agriculture and the County of Tucker each appropriated \$20.00 to reimburse an owner of cultivated Ribes for the destruction of his 44 bushes. The Division of Blister Rust Control has been engaged in nursery sanitation at Parsons since August 22, 1928.

Beginning July 1, 1932 through the cooperative agreement with our Department, the active agencies of the State have been broadened to include the State Game, Fish and Forestry Commission as well as the West Virginia Department of Agriculture. This brings into the control program all the members of the Forest Service who are stationed in various parts of the State.

Acreage of white pine

149,000 acres is the latest estimate, made by J.A. Cope in August, 1930, distributed as follows:

<u>County</u>	<u>Acres in white pine 5% or better</u>
Grant	2,000
Greenbrier	4,000
Hardy	1,000
Mercer	12,000
Monroe	2,000
Pendleton	80,000
Pocahontas	25,000
Raleigh	20,000
Summers	3,000
State total - - -	<u>149,000</u>

Of this area it is estimated that there are 21,823 acres in the National Forests which is 14.68% of the total area. The white pine timber in National Forests has been estimated by the Forest Service to be 14.68% of the white pine timber in the State, and I considered that a fair estimate of the area in white pine in National Forests would be also 14.68%.

Stand of White Pine

According to Forest Service statistics there are 22 million feet of white pine sawtimber and 177,000 cords of white pine on cordwood areas valued at \$460,670.00. The federally-owned stumpage is estimated at 3,230,000 feet of sawtimber valued at \$22,158.00.

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Cooperation

The State and one county expended \$40.00 in securing the destruction of one lot of cultivated bushes in first half of the calendar year 1932. In the second half of the year, the State expended \$_____ in connection with nursery sanitation, nursery scouting, and preeradication surveys of pine areas.

Ribes Eradication

No Ribes eradication projects were carried on during the year except at Parsons Nursery and Conley Nursery dealt with under nursery sanitation.

RIBES ERADICATION IN WEST VIRGINIA

Location	County	No. of acres of pine	No. of Ribes	Species	Total all Species
Preeradication Survey					
Boiling Spring Tract	Hardy	10	1	R. cynosbati	1
Geo. Wash. Nat. For.					
Seneca State Forest	Pocahontas	10	28	R. rotundifolium	27
Watoga State Forest	"	3	5	" "	5
White Pine Picnic Park	Raleigh	8	1	R. cynosbati	1
6 miles S. of Berkley					
Ribes Sanitation					
Conley Forest Nursery	Cabell		4	R. Grossularia	4
Parsons " "	Tucker		2579	R. rotundifolium	
			25	R. vulgare	
			22	R. grossularia	2631
			4	R. americanum	
			1	R. odoratum	
Total 6 places		38	2670		2670

Preeradication Surveys

General scouting for white pine was made by District Forester, O.O. Nutter of White Sulphur Springs and Pierce northeast of Minnehaha Springs traversing the valley of Anthony's Creek in Greenbrier County. White pine stands were found at various places on this creek but no Ribes. On Thorny Creek, partly within Seneca State Forest and partly adjoining it 29 $\frac{1}{2}$ acres of pine in 7 small areas were found free of Ribes. The two acre pine plantation on the Watoga State Forest at the old Crouse farm was scouted but found Ribes free. Both State forests are in Pocahontas County.

On Thomas Creek from Dunmore south there are a number of good pine lots. Ribes were found within 900 feet of one pine lot on the Seneca State Forest and plans have been made to protect the pine next spring. Additional scouting for Ribes will be carried on in the other pine lots in this drainage area at the same time.

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Table 1

Year		1950		1951		1952	
Total		1950		1951		1952	
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	1951	1	1	1	1	1	1
	1952	1	1	1	1	1	1
2	1950	1	1	1	1	1	1
	1951	1	1	1	1	1	1
	1952	1	1	1	1	1	1
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5	1950	1	1	1	1	1	1
	1951	1	1	1	1	1	1
	1952	1	1	1	1	1	1
6	1950	1	1	1	1	1	1
	1951	1	1	1	1	1	1
	1952	1	1	1	1	1	1
7	1950	1	1	1	1	1	1
	1951	1	1	1	1	1	1
	1952	1	1	1	1	1	1
8	1950	1	1	1	1	1	1
	1951	1	1	1	1	1	1
	1952	1	1	1	1	1	1
9	1950	1	1	1	1	1	1
	1951	1	1	1	1	1	1
	1952	1	1	1	1	1	1
10	1950	1	1	1	1	1	1
	1951	1	1	1	1	1	1
	1952	1	1	1	1	1	1

Table 2

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A small pine lot of three acres on Island Lick Run in the Watoga State Forest was scouted and Ribes found. This lot will be worked next spring.

Black Currant Elimination: None..

National Forests

The Monongahela National Forest lies wholly within the State, while the George Washington National Forest has a small area within the State in Hampshire, Hardy and Pendleton Counties. The gross area of both National Forests within West Virginia is 819,100 acres, but the net area is but 327,284 acres. Very little white pine is to be found within the Monongahela Forest, though there were formerly fine stands of this species present in Tucker County. The Forest is contemplating planting white pine on Clover Run, a few miles north of Parsons. This area was investigated in May and found free of Ribes.

This Division has been carrying on nursery sanitation at the Parsons Nursery since the fall of 1928. Ribes eradication has been carried on over 549 acres. A summary of this work follows

SUMMARY SHOWING RIBES ERADICATION AT PARSONS NURSERY, 1928-32, Inc. Including Both Initial Eradication and Reworking

		1929 ^a	1930	1931	1932	Totals
Area in acres, initial eradication of Ribes		414	52	68	15	549
Area reworked for Ribes (In acres)		0	300	466	534	
Total area on which Ribes have been eradicated (in acres)		414	352	534	549	549
Wild Ribes pulled		3136	403	1349	2583	7471
Cultivated Ribes pulled		75	1	1	48	125
Total Ribes pulled		3211	404	1350	2631	7596
Number of Ribes per acre		7.7	1.1	2.5	4.8	13.8
Number of hours required for eradication work during year including reworking		157	58	83	106	404
Cost on basis of \$5 per day for foreman	Total	\$91.00	\$30.25	\$43.38	\$46.75	\$211.38
	Per acre	0.219	0.085	0.081	0.085	0.385

^aIncludes 22 bushes of R. cynosbati L. pulled in reconnaissance survey of August, 1928.

For more details see my annual reports on the Ribes suppression around Parsons Nursery.

In the George Washington National Forest white pine is found in the three counties of Hampshire, Hardy and Pendleton. Preeradication surveys were begun in Pendleton County in 1930 and in Hardy and Hampshire Counties in 1932 and will be continued annually until all white pine areas have been scouted. Together with Ranger Keckley the drainage areas of Frye's Run, Boiling Spring and Trout Run and Landaker's Flat were scouted for Ribes.

Two of the Forest Officers on the George Washington National Forest, Messrs. Glenn and Sipe made a timber survey of Rough Run from December 1, 1931 to February 20, 1932 in Pendleton County, West Virginia. In connection with this survey and map they made a report on gooseberry conditions which will be of great assistance in planning eradication work in this part of the forest.

White Pine Plantations

A list of the white pines shipped from the State forest nursery in 1931 and 1932 was received from Mr. J.W.K. Holliday the State Forester on August 2, 1932. These records show 21,975 white pines distributed in 1931, to 17 persons and companies. In 1932, 36,750 white pines were distributed to 35 persons, companies and institutions. Most of the plantings made in the two years, however were small; 36 being under 1000 trees. This leaves but 16 plantations of 1000 trees or over which are listed below:

1931 Planting

<u>Amount</u>	<u>Name</u>	<u>Address</u>
1500	Winifred Company	Charleston, W.Va. (Kanawha County)
3000	B.R. Weimer	Bethany, W.Va. (Brooke County)
8500	L.D. Baugh	Nolan, W.Va. (Mingo County)
3000	J. E. Romine	Wheeling, W.Va. (Ohio County)
2000	W.C. Gist	Wellsburg, W.Va. (Brooke County)
1000	John Noble Maxwell	Waynesboro, Va. (Augusta County)
1500	W.C. Gumbel	New Cumberland, W.Va. (Hancock County)

1932 Planting

1000	Winlock Garden Club	Winlock, Washington (Lewis County)
4500	Clarksburg Kiwanis Club	Clarksburg, W.Va. (Harrison County)
1000	Shawnee Hills Corp.	Wheeling, W.Va. (Ohio County)
2000	Howard Collieres	Chattaroy, W.Va. (Mingo County)
10,000	Huntington Park Comm.	Huntington, W.Va. (Cabell County)
1,000	Hopemont Sanitarium	Hopemont, W.Va. (Preston County)
5,000	Ohio County Home & Farm	Wheeling, W.Va. (Ohio County)
1,500	W.L. Wilson	Huntington, W.Va. (Cabell County)
2,000	F.W. Tuckwiller	211 Broad St., Charleston, W.Va. (Kanawha Co.)

A map showing the location by counties of the white pine plantations made in 1931 and 1932 follows:

Nursery Sanitation

The protective work around the Parsons Nursery on the Monongahela National Forest has been described under National Forests.

The Conley State Forest Nursery at Greenbottom(P.O. Lesage) in Cabell County was scouted by Pierce with one local laborer on September 9 and 10, for distance of one mile for R. nigrum and for 1500 feet for all Ribes. Since the nursery is close to the Ohio River, we scouted in the State of Ohio for R. nigrum as well as in West Virginia. Only four cultivated gooseberries were found close to the nursery and these were destroyed by Mr. Floyd E. Cole who is in charge of the nursery. No wild Ribes were found nor have there been any found in the County as far as our records go.

Ribes Survey

No general Ribes survey was made this year in the State. Data from previous surveys supplemented by data from West Virginia Geological Survey of 1913 have been compiled and the species found by counties is shown on an accompanying map. According to our present knowledge wild Ribes are confined to the eastern half of the State and three or four southern counties.

Greenbrier County

No Ribes were found by Mr. O.O. Nutter, District Forester and Pierce on a trip through the white pine country of Anthonys Creek northeast of White Sulphur Springs, though stops were made at a half dozen likely Ribes places. Old residents said they knew of no wild gooseberries in Anthonys Creek except at the headwaters of its small tributaries. White pine, however is found more in the valleys than at the higher elevations.

Pocahontas County

No Ribes were found along Thorny Creek near Thorny Creek School (Elev. 2500 ft.) Five or six small runs tributary to Thorny Creek were scouted so far up stream as white pine was running 5% of the stand, 29 acres of pine being scouted without finding any Ribes nearby.

In the Thomas Creek watershed only 2 to 3 miles north, however, abundant Ribes were found in the bottoms and flats adjacent to the ranger station and within 900 feet of white pine on the Seneca State Forest. (Elev. here is 2500 ft.) These Ribes will be destroyed this spring. Ribes were also located on the Watoga State Forest on Island Lick Run near a small patch of white pine. (Elev. 2400 ft.) These will also be destroyed this spring. No Ribes were found near the old Crouse farm plantation of white pine on the Watoga State Forest (Elev. 2800-3000 ft.)

Pendleton County

Two forest officers of the George Washington National Forest made a Ribes survey in connection with the Rough Run timber survey begun in

The first part of the document is a letter from the President of the United States to the Congress, dated January 3, 1862.

The President states that he has the honor to acknowledge the receipt of the letter from the Congress, dated December 15, 1861, and to inform them that the same has been forwarded to the proper authorities for their consideration.

Second Part

The second part of the document is a report from the Secretary of the Treasury, dated January 10, 1862, in relation to the public debt.

Third Part

The third part of the document is a report from the Secretary of the Interior, dated January 15, 1862, in relation to the public lands.

Fourth Part

The fourth part of the document is a report from the Secretary of the War, dated January 20, 1862, in relation to the military forces.

The fifth part of the document is a report from the Secretary of the Navy, dated January 25, 1862, in relation to the naval forces.

Fifth Part

The fifth part of the document is a report from the Secretary of the Navy, dated January 25, 1862, in relation to the naval forces.

December 1931 and ending February 1932. Several different watersheds from Road Run to Little Rough Run were scouted all being tributary to the Moorefield River. Ribes varied from none to abundant in each of the watersheds, with white pine varying from none to 20% or more of the stand. A portion of the report by Mr. Sipe is reproduced here:

"In general, it may be said that the gooseberry problem is limited to certain areas, namely, in the upper mile of the hollows, or roughly, above the point where a portable mill could be hauled without much difficulty. Below this point the hollows widen out, rock areas are scarce, and Ribes are rare. Very few bushes were seen in the Pope, Rough Lick Run and Fort Seybert units. Above the portable mill point the hollows are narrow and rocky, and are ideal habitat for gooseberries.

"Any eradication policy or measures must consider another important fact. All along the top of Shenandoah Mountain, from the Brandywine road to Cow Knob, will be found gooseberry bushes, mostly large ones. About 80% of them are on private land. White pine occurs in groups composing over 5% of the stand at frequent intervals. As this situation is on a mountain top, with bushes out in the open fields, the danger of infection here is proportionately great.

"Another point to be considered is this: White pine forms in general a higher percentage of the Upper Slope type than it does on Cove or Lower Slope. Since Upper slopes are not considered merchantable (accessible) from a sawtimber standpoint, the situation exists of having Ribes and white pine on areas that may never be cut over. This condition is chiefly limited to the extreme heads of hollows.

"Generally speaking, eradication seems most desirable in Little Rough, Rough and Fishers runs. There is seldom more than one area in the other drainages that will need working."

Future Work

Pine & Ribes Survey

Complete a pine and Ribes survey in the white pine counties of Grant, Hardy, Pendleton, Pocahontas, Greenbrier, Monroe, Summers, Raleigh and Mercer as soon as possible. This will probably take several years, but assistance can be secured from District Foresters.

Ribes Eradication

Begin control work on Seneca and Watoga States Forests in Pocahontas County this spring and from them spread out to other eradication work on adjacent lands, as cooperation can be secured.

Continue Ribes eradication around Parsons Nursery with assistance from U. S. Forest Service. Check up on the eradication work carried on by George Washington National Forest in Hampshire, Hardy or Pendleton Counties.

Education

Apprise all owners of white pine plantations of the danger to their pine from the blister rust which was first found in the State in 1931, and of the desirability of their protection of the pine through Ribes elimination adjoining the pine. To most plantation owners this will be a matter of elimination of cultivated currants and gooseberries. Carry on general education of the public through newspaper notices of control work being carried on, value of white pine in state, etc. Carry on special educational work in the pine-growing counties, through the schools and other agencies.

Cooperation

Secure as soon as practicable the appointment by the State of someone to take charge of all blister rust control work in the State and who will at least put in six months in the year - April to October on the work.

RGP:cjp
2/24/33

Nurseries

The following list of nurseries handling white pines was sent in by the State Entomologist.

State Forest Nursery, (P.O.Lesage)Greenbottom,W.Va.	P. strobus 41,000 trees.	For forestry
John Dieckmann & Sons, Elm Grove, W.Va.	P. strobus 305 trees	Ornamental
Mt. State For. & Nurs. Co. Gladwyn, W.Va.	P. strobus Several 100	"
Home Nursery Co. Fort Gay, W.Va.	P. strobus 100 trees	"
Gold Nursery Co. Mason City,W.Va.	P. strobus 75 trees	"
Rose Hill Nursery Annamoriah, W.Va.	P. strobus 20 trees.	"

Informational Activities

There were 6 personal interviews with pine owners and others, and 6 individuals were personally instructed concerning the blister rust in the field. Blister rust publications were distributed to 10 persons. In addition, a large set of publications including all those available were sent Dr. C. R. Orton for the library of the Division of Plant Pathology at the University of West Virginia at Morgantown. A supply of 10 different publications were sent the State Forester for his library and for his distribution. Three news items were published, one in the Charleston, Virginia, Gazette on September 8, and two in the Marlinton papers in September.

Numerous sets of blister rust specimens were sent the following:

- | | |
|---|---|
| Dr. C. R. Orton - | 16 specimens of Ribes from W. Va. and other eastern States. |
| " | 6 specimens of pine in test tubes. |
| " | 2 large trunk specimens. |
| Mr. A. B. Brooks, Park Naturalist, Oglebay Park at Wheeling, W. Va. | 9 test tube specimens and several sections of infected trunk. |
| Mr. J.W.K. Holliday, Chief Forester. | Specimens of blister rust on pine and Ribes. |
| Mr. W. E. Rumsey, State Entomologist. | Has been sent blister rust specimens in 1932 or previously. |

Copies of the annual report on Ribes Suppression Around the Parsons Nursery on the Monongahela National Forest were sent: Mr. J.W.K. Holliday; Mr. W. E. Rumsey; Dr. Waldo Craig, Entomologist; Dr. C. R. Orton; Mr. A. A. Wood, Forest Supervisor at Elkins; Mr. D. A. Oliver, nurseryman at Parsons.

The Blister Rust News is being distributed monthly to Messrs. A. B. Brooks, Prof. Frank Brooks, J. W. K. Holliday, D. A. Oliver, Dr. C. R. Orton, Thomas W. Skuce, Extension Forester, and Mr. A. A. Wood.

White Pine Lumber Production *

1925	. . . . .	3,970,000	Ft. B.M.
1926	. . . . .	3,446,000	" "
1927	. . . . .	3,767,000	" "
1928	. . . . .	1,399,000	" "
1929	. . . . .	2,673,000	" "
1930	. . . . .	4,297,000	" "

* The above figures are from bulletins of the U. S. Dept. of Commerce, Bureau of the Census.

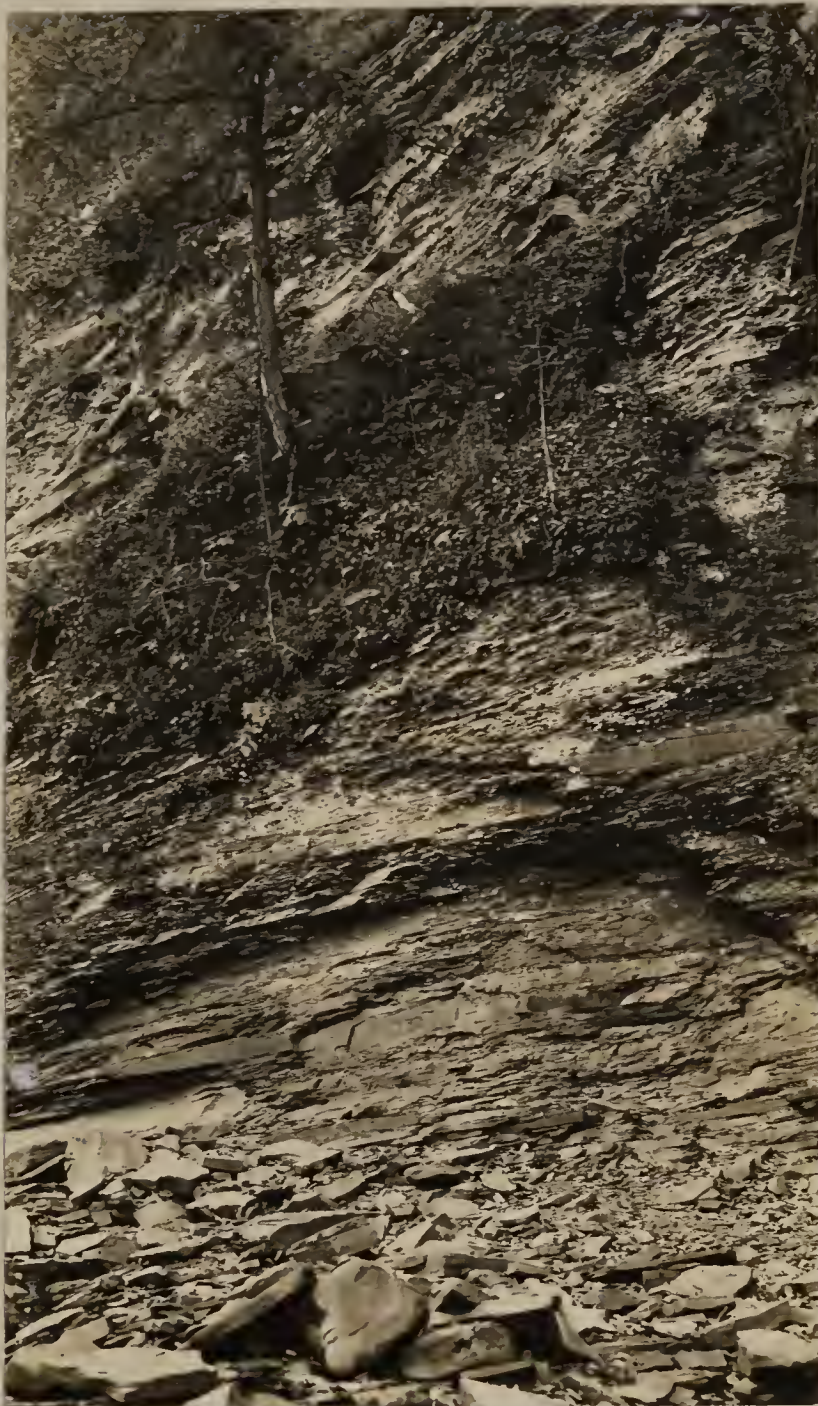
Blister Rust Distribution

The rust was first found on Ribes rotundifolium in West Virginia in 1932 by Messrs. C. T. Geiser and L. W. Hodgkins near Thomas in Tucker Co. and near Alpena in Randolph Co. Though scouting was carried on in 1932 by the writer in several counties in the pine section of the State, no signs of the blister rust were found.

Dr. C. R. Orton, Head of the Dept. of Plant Pathology at West Virginia University, Morgantown, writes under date of November 22, 1932: "I have looked for Cronartium ribicola on Ribes in different parts of the State this year on incidental collecting trips, but have discovered no infection, and a good many bushes have been observed."

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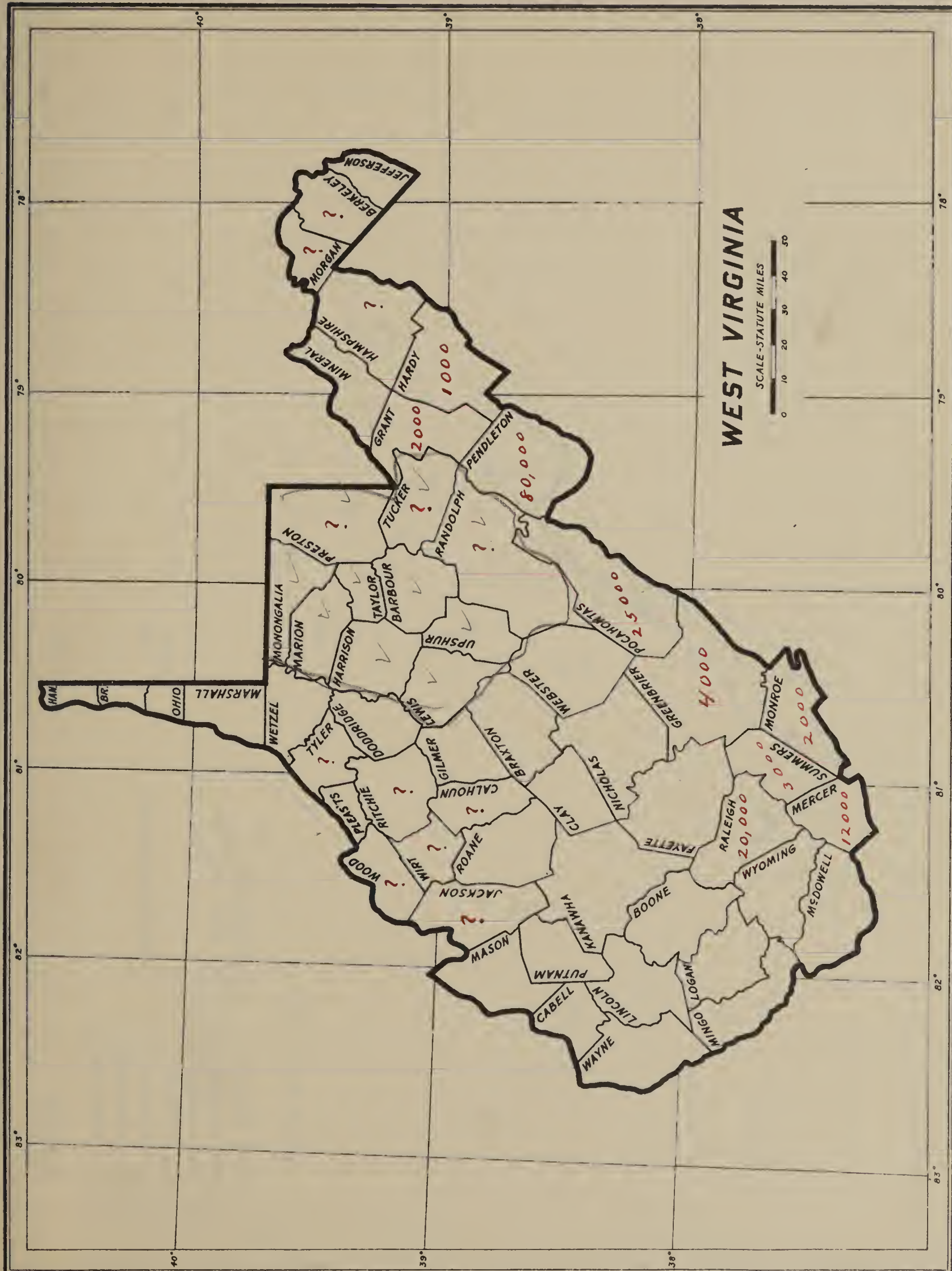
Steep slope on south side of Blackwater River opposite the Forest Service Nursery at Parsons, West Virginia. Ribes cynosbati are found in this thin soil, and in crevices in the rocks. Photo taken Oct. 3, 1932.

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View of Turkey Knob from the U. S. Forest Service Nursery at Parsons, West Virginia.
From 1928-1932, inclusive, a total of 4,010 Ribes cynosbati were removed from Turkey Knob.
The upper portion of Turkey Knob is outside of the 1500 ft. limit, but the Ribes were destroyed to the top of the Knob.

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2,000, etc. = Acreage according to J. A. Cope's Report.

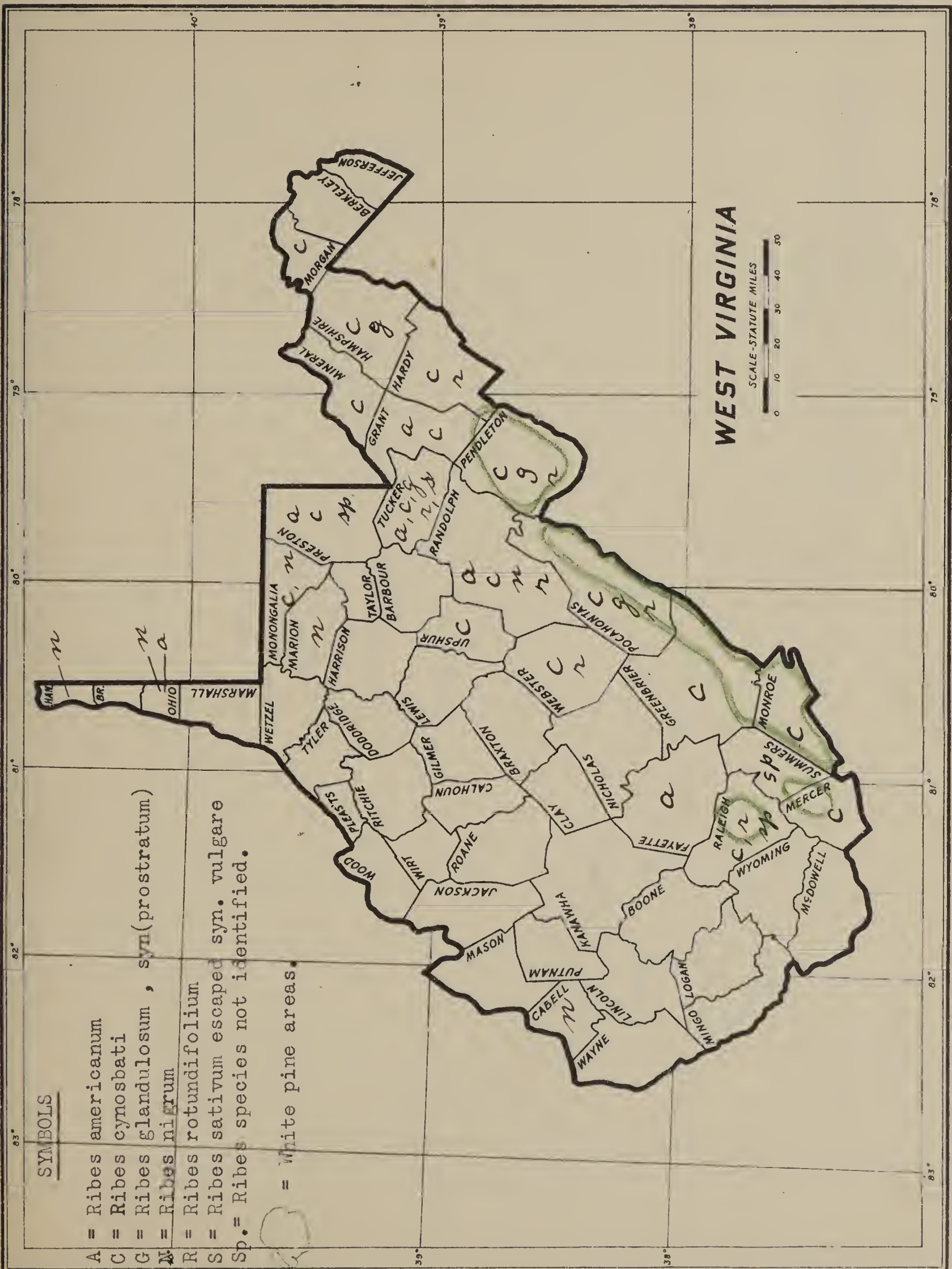
= Native white pine present according to Reports of C. F. Mills-
pough, 1913, A. K. Perry, 1917, and Roy G. Pierce, 1931.

MAP SHOWING GENERAL DISTRIBUTION OF WHITE PINES, WILD CURRANTS AND GOOSEBERRIES
AND RIBES NIGRUM, EUROPEAN BLACK CURRANT.

42

U. S. DEPARTMENT OF AGRICULTURE

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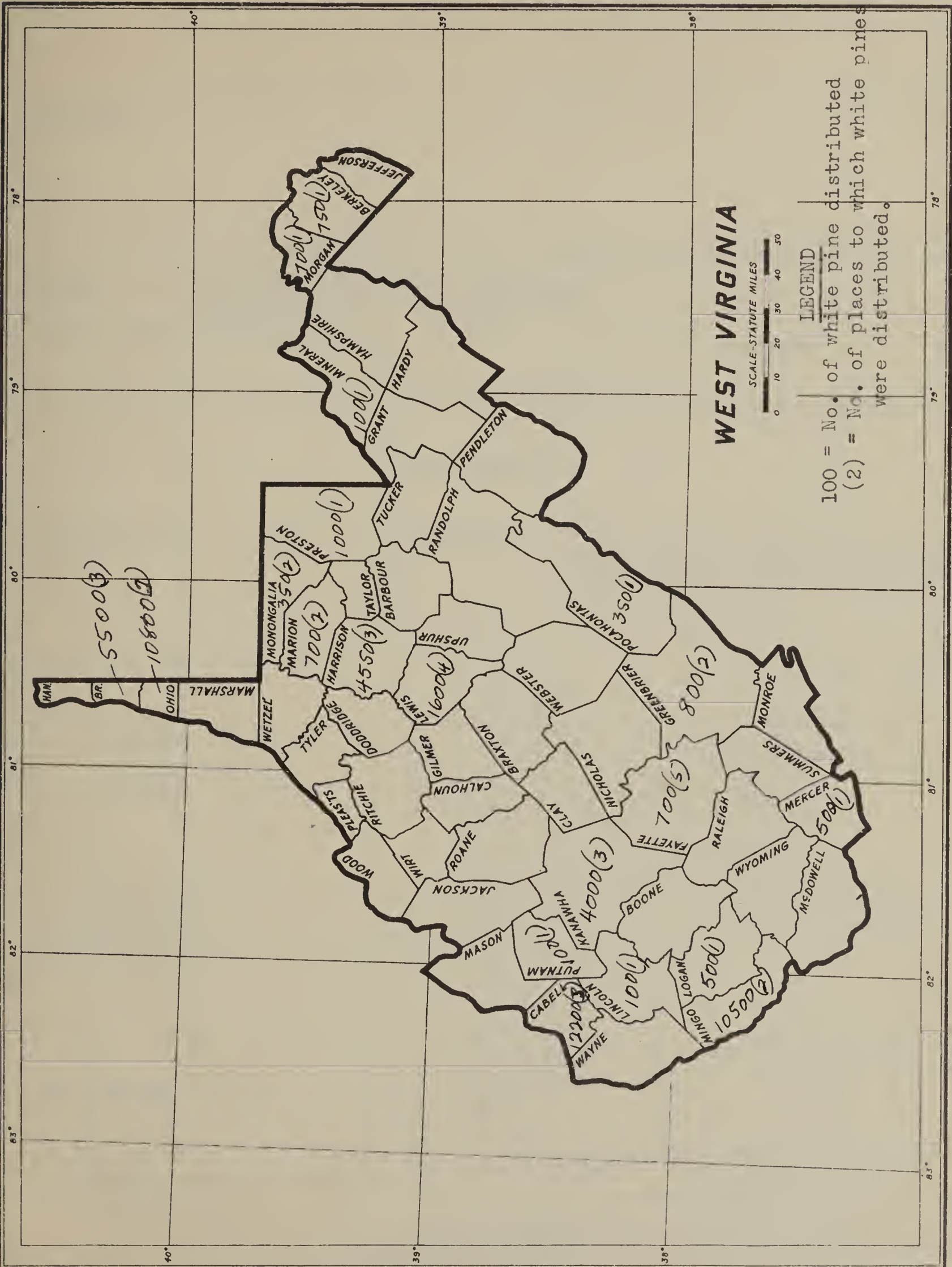
Ray G. Cline
July 29, 1932

WHITE PINE DISTRIBUTION FROM STATES NURSERIES IN WEST VIRGINIA IN 1931 and 1932

43

U. S. DEPARTMENT OF AGRICULTURE

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R.G. Pierce, 1931 - 8-3
Data from J. W.K. Holliday,
Chief Forester-Letter of 8/2/32

Table 1. CONTROL WORK ON STATE AND FEDERAL FOREST NURSERIES IN SOUTHERN APPALACHIAN DISTRICT IN 1932.

Table 1.

State Nurseries	Location	Number of white pines <i>P. strobus</i> in nursery at end of 1932	Number of white pines distributed in 1931	Area scouted for Ribes (acres)	Number of places found with Ribes within 1500 ft. protective zone	Number of Ribes found at these places	Number of Ribes destroyed Initial Feworking	Number of Ribes not destroyed	Safety zone		Cost estimates				Estimated % of effectiveness of protection	Date inspected in 1932	Remarks
									Width	How marked	Federal	State	Private	Total			
Delaware	Lincoln Sussex Co.	10,000	9,000	160	1	15	0	15 ⁴			2.00	2.00		4.00		September 28	
Maryland	College Park Prince Georges Co.	42,000	40,100	2,010 ²	5	17	10	7 ⁴	1500 ft.	On map	\$7.50	\$3.00	\$1.70	\$12.20	25	August 23	Two places in 1500 ft. zone still have Ribes, cultivated red currants and gooseberries.
North Car.		0 ¹	2,000	0													
Virginia	Charlottesville Albemarle Co.	87,000	7,200	2,010 ²	0				1500 ft. & 1 mi.		10.00	5.00	0	15.00	100	August 24, 25	Nursery well protected naturally in a non-Ribes country.
West Virginia	Greenbottom Cabell Co.	41,000	10,000	2,010 ²	1	4	4		1500 ft. & 1 mi. for bl.		12.50	4.00	0	16.50	100	Sept. 9, 10	Nursery well protected; in a non-Ribes non-pine country. Cultivated Ribes not abundant between 1500' to 5280'. Three owners have 27 gooseberries in this outer zone.
Total State Nurseries		180,000	68,900	6,190	7	36	14	22			30.00	\$12.00	\$1.70	43.70			
Federal Nurseries																	
West Virginia	Parsons* Tucker Co.	414,000	83,300	549	24 out of 68 ³ blocks worked	2631	2631		1500 ft. & 1 mi.	On map	46.75	20.00	20.00	86.75	90	May 2-6 Sept. 15-16 Oct. 2-4	Nursery well protected through systematic inspection each spring which should keep Ribes down to a minimum. Map shows boundaries and blocks with number of Ribes located.
Grand Total		594,000	152,200	6,739	31	2,677	2,645	22			76.75	32.00	21.70	130.45			

*Cost of Pierce's labor as foreman estimated at \$5.00 per day.

¹State Forester furnished this information²This includes the zone for *Ribes nigrum*The protective zone extends in some directions for 1 mile
Steps are being taken to destroy these bushes.

TABLE 2. BLISTER RUST CONTROL OUTSIDE OF NURSERIES.

State	Location	Owner	Area from which Ribes were removed, 1932 (Acres)			Number of Ribes removed in 1932 (all wild)						Number of Ribes removed previous to 1932			Total number bushes removed 1929 to 1932			Cost of Ribes removed.	
			Initial work	Reworked areas	Total area	On In-ital work	On Re-worked areas	Total	Per acre			Wild	Culti-vated	Wild and cultivated	Wild	Culti-vated	Total	in 1932	
									Ini-tial work	Re-worked area	Total work							Total	Per acre
Virginia	Geo. Wash. Nat. Forest	U.S. For. Service	635	600	1,235	5753	19993	25,746	9.0	33.3	28.4	13,586	2	13,588	39,332	2	39,334	\$103.20	\$0.081
	Natural Bridge National For.	U.S. For-est Ser.	10	0	10	327	0	327	32.7	--	32.7	15	0	15	342	-	342	9.80	0.98
	Dry River above Hawley Springs Rockingham Co.	City of Harrisonburg	800		800	10200		10,200	12.7		12.7	0	0	0	10,200	0	10,200	27.30	0.034
Totals			1445	600	2,045	16280	19993	36,273	11.3	33.3	17.7	13,601	2	13,603	49,874	2	49,876	140.30	0.067

TABLE 3. PREERADICATION SURVEY IN SOUTHERN APPALACHIAN STATES, 1932.
Areas Eliminated by Scouts

State	County	Location	Owner	Elevation in feet	Number acres of pine	Number acres surveyed	Number of pines when planted	Number of Ribes found	Number of Ribes destroyed	Estimated cost of survey		
										To U. S.	To other	Total
Delaware Maryland	Kent	Harrington.	W. Sapp	62	8	8	-	0	0	\$2.00	\$1.50	\$3.50
	Baltimore	Along Gunpowder river above Lock Eaven.	City of Baltimore	180 to 250	350	400	350,000	0	0	8.10	1.80	9.90
	Frederick	Emmitsburg.	Emmitsburg Water Co.	700	3	40	3,000	1 escaped vulgar	1	2.70	1.35	4.05
	Washington	Fort Frederick near Big Pool.	State of Md.	400	9.25 planted 9.75 native	160	3,600	0	0	2.70	.35	3.05
	Allegany	Green Ridge State Forest.	" " "									
		15 mile creek near Little Orleans	" " "	500	50	50		0	0	1.35		1.35
		4 miles south of Piney Grove on road to Little Orleans.	" " "	800	10	30		0	0	.65		.65
		Billmeyer and Perry Barnes Game Refuges west of Town Hill.	" " "	1,000	50	50		0	0	1.35		1.35
		15 mile creek north of Route 40, in 2 mile stretch.	" " "	800	40	40		0	0	1.35		1.35
		Road west from 15 mile creek par- allel to Pennsylvania line.	" " "	1,000	5	5		0	0	.65		.65
	Garrett	Harrington Manor Plantation	State of Md.	2,400	8	20		0	0	1.35	.65	2.00
		Prier Ridge Plantation.	" " "	2,550	2.5	5		0	0	1.35	.65	2.00
		Total for State of Maryland			537.5	800	356,600	1	1	21.55	4.80	26.35
Virginia	Augusta	Deerfield Ranger District.	Geo. Wash.	1600 to								
		Hite Hollow.	Nat. Forest.	1800.	50.0	60		0	0	2.70	2.70	5.40
		Kennedy Draft.	" "	" "	5.00	10		0	0	2.70	2.70	5.40
		Taylor Hollow	" "	" "	25.00	30		0	0	2.70	2.70	5.40
		Dry River Ranger District.	" "									
		North Fork of McKittricks Branch	" "	1700 to 2100	10.0	40		0	0	1.35	1.35	2.70
		Timothy Hollow.	" "	1600 to 1700	4.0	15		0	0	2.70	1.80	4.50
		Freemason Run	" "	1600 to 1700	28.0	40		0	0	2.70	1.80	4.50
		Flat Run	" "	2250 to 2350.	3	20		0	0	2.70	1.80	4.50
	Warren	Gooney's Creek	Shenandoah Park Area	1,000	1	1		0	0	.30	.30	.60
		Middle Branch of Flint Run	Shenandoah Park Area	800	3	5		0	0	.65	.65	1.30
		Overall Run	Shenandoah Park Area	900 to 975	5	40		0	0	4.05	4.05	8.10

TABLE 3. PREERADICATION SURVEY IN SOUTHERN APPALACHIAN STATES, 1932. (Cont'd)
Areas Eliminated by Scouts.

State	County	Location	Owner	Elevation in feet	Number acres of pine	Number acres surveyed	Number of pines when planted	Number of Ribes found	Number of Ribes destroyed	Estimated cost of survey		
										To U. S.	To other	Total
Virginia	Page	Jeremiahs Run	Shenandoah Park Area	900 to 1000	6	20		0	0	4.05	4.05	8.10
		Pass Run	Shenandoah Park Areas	1000 to 1500	200	400		0	0	4.05	4.05	8.10
		Dry Run	" "	900	80	40		0	0	2.70	2.70	5.40
		Main Branch	" "	1250- 1300	30	30		1	1	2.70	2.70	5.40
		North Branch	" "	1300	7	25		0	0	2.70	2.70	5.40
		South Fork of South Branch	" "									
	Clarke Albemarle	Panorama Mt. at Thornton's Gap	J.A. Williams	2800	1	4	100	0		1.35	1.35	2.70
		White Post, adjoining the Tynleries	State of Va.	610	5	5	20,000	0		0.65	0.65	1.30
		Watershed of City of Charlottesville at the Forks of Moorman's River	City of Char- lottesville	1000 to 1100	5	15		0	0	2.70		2.70
		In Charlottesville	J.W. Rothwell	500	0.5	1	400+	0	0	1.35		1.35
		Cisport	A. Leverett	500	2.0	2		0	0	0.50		0.50
		Total for Virginia			470.05	803		1	1	45.30	38.05	83.35
West Va.	Hardy	Lost River Ranger District	Geo. Wash. N.F.	1100 to 1300								
		Boiling Spring Tract	" " " "	" " "	10	40		4	1	3.50		3.50
		Frye's Run	" " " "	" " "	20	80		0	0	6.05		6.05
		Landaker's Flat	" " " "	1600 to 1700	7	20				3.50		3.50
		Thorny Creek on Seneca State Forest	State of W. Va.	2500	4	10	4,200	0	0	1.35		1.35
		Thorny Creek	"	2500	25½	100		0	0	5.40		5.40
	Pocahontas	Old Crouse Farm Plantation Watoga State Forest	" " "	2800 to 3000	2	10		0	0	2.70	.50	3.20
		Pine Grove Picnic Park, 6 miles S. of Berkeley	"	2200 to 2500	8 59½	8 188		1 cynos. 5	1 2	1.35 23.85		1.35 24.35
		Grand Total 4 states			1,075½	1799	381,300	7	4	92.70	44.85	137.55

Woy G. Pierce, Feb. 14, 1933.

TABLE 4. PREERADICATION SURVEY IN SOUTHERN APPALACHIAN STATES, 1932.

Ribes Present - Not Eliminated by Scout.

State	County	Location	Owner	Elevation in feet	Number acres of pine	Number acres surveyed	Number of pines when planted	Number of Ribes found	Number of Ribes destroyed	Estimated cost of survey		
										To U. S.	To Other	Total
Maryland	Garrett	Swallow Falls	Masons of Md. & Pennsylvania	2,550	40.	4		Many	0	\$1.35	\$.65	\$2.00
		Near Hutton	J.A. Hughes	2,600	10.	10		"	0	1.35	.65	2.00
		Total for Maryland			50	14				2.70	1.30	4.00
Virginia	Albemarle	Tiverton Farm at Greenwood 6 mi. west of Crozet	Major Owsley	800	0.5	3	400	1 R. gross.	0	.70		.70
Virginia	Albemarle Augusta	In Charlottesville.	Dr. H.S. Hedges	500	1.0	1	500	6 " "	0	.70		.70
		Whippoorwill Camp South of North Mountain, Va.	Geo. Wash. Nat'l Forest	2,000	15.	5		20 R. cynos	0	1.35	1.35	2.70
		Skidmore Run - North River Watershed	" " "	1700 to 1900	37.	40		Numerous	44	2.70	2.70	5.80
	Page	Skyland	Shen.Natl.Park	3,600	10.	5		"	0	.70	.70	1.40
		Sexton Cabin, Appal. Trail	Shenandoah	3,000 to	10.	10		"	0	.70	.70	1.40
	Rappahannock	Club along Sky Line Drive	National Park	3,200								
		Total for Virginia			73.5	64	900		44	6.85	5.45	12.30
West Virginia	Hardy	Trout Run at Devil's Hole Camp	Geo. Wash. Nat'l Forest	1700 to 1800	10	20		Many	0	4.05	.00	4.05
	Pocahontas	Thomas Creek opposite Ranger Station, Seneca, State Forest	State of West Va. & Ranger Schrader	2,500	10.0	20		Numerous rotundifolium	27	5.40		5.40
	"	Island Lick Run on Watoga State Forest, 7.5 miles S.W. of Huntersville just above Bush's farm.	State of W. Va.	2,400	3.0	5		Numerous	5	2.70	.50	3.20
		Total for West Virginia			23.0	45			32	12.15	.50	12.65
		Grand Total for Southern Appalachian States			146.5	123	900		76	21.70	7.25	28.95

R.G. Pierce, Feb. 14, 1933.



BLISTER RUST CONTROL

in the

LAKE AND NORTH CENTRAL STATES REGION 1932 at Montreal.
In the Lake and North Central States Region, the
Blister Rust has been made to state not only some work during the
collected past time but also some previously in order to
show the status of the control. By

Material has been H. N. PUTNAM, from the State Landers'
reports, Eastern Reports, reports from State Conservation Reports,
and the "Forestry Associate Pathologist. other sources.

J. E. PUTNAM,
Associate Pathologist.

BLISTER MUST CONTROL

in the

LAKE AND NORTH CENTRAL STATES REGION 1932

By

H. N. PUTNAM,

Associate Pathologist.

FOREWORD

In this, the first annual report on Blister Rust Control in the Lake and North Central States Region as a unit, the attempt has been made to state not only work done during the calendar year 1932 but also work done previously in order to show the status of the control program to date.

Material has been freely drawn upon from State Leaders' reports, Eastern Reports, reports from State Conservation Departments, the "Forestry Almanac" for 1933 and other sources.

H. N. PUTNAM,
Associate Pathologist.

FORM WORD

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H. N. PUTNAM,
Associate Pathologist.

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GENERAL SUMMARY - BLISTER RUST CONTROL IN THE LAKE AND NORTH

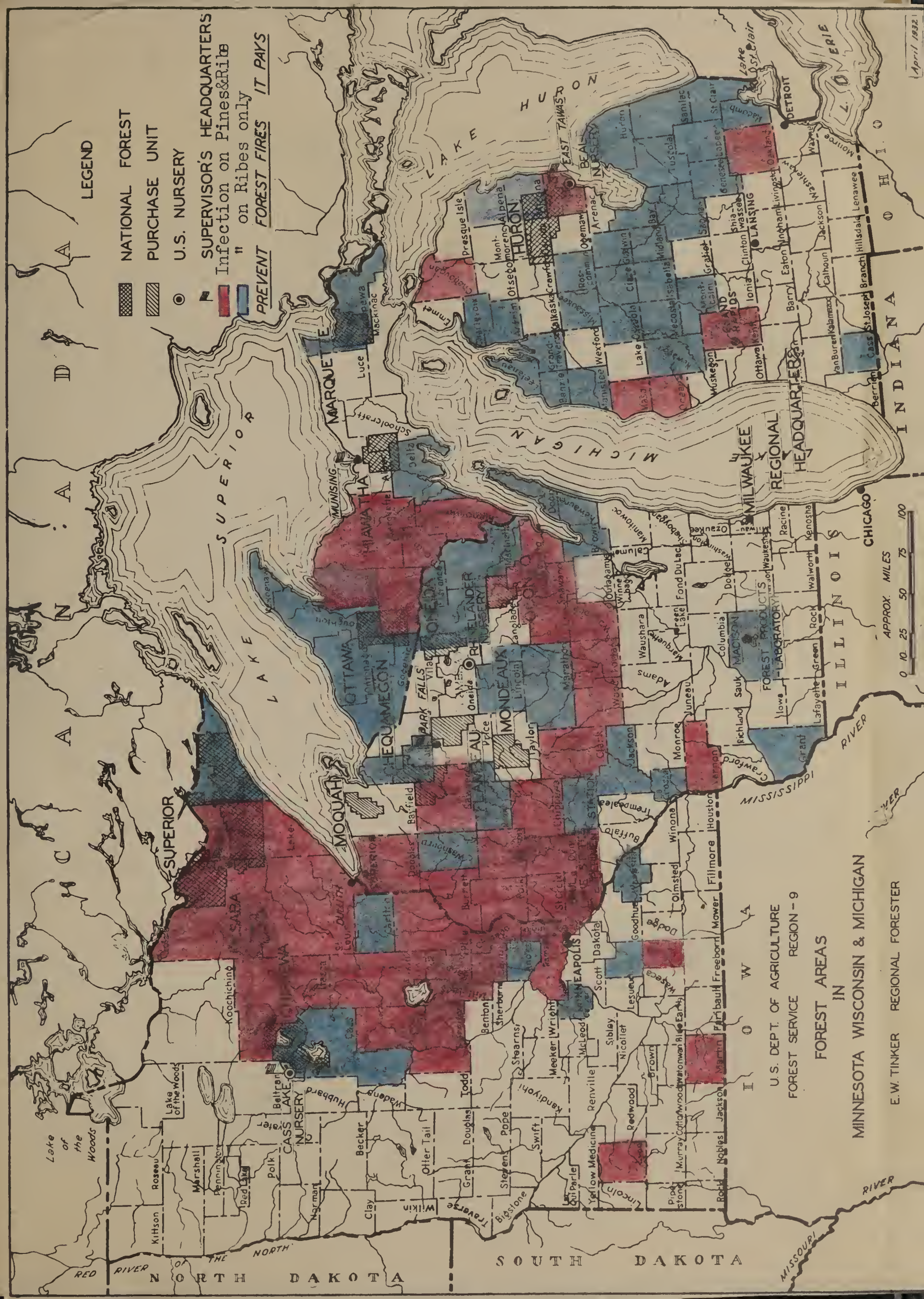
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COUNTIES KNOWN TO BE INFECTED WITH BLISTER RUST, LAKE STATES REGION

DECEMBER 1, 1932.



April 1932

GENERAL SUMMARY - BLISTER RUST CONTROL
IN THE LAKE AND NORTH CENTRAL STATES 1932.

SPREAD OF THE RUST.

The year 1932 will probably go down in blister-rust history in the Lake States as a year of widespread rust, the year of origin of large numbers of cankers and new infection centers. Frequent rains throughout the growing period, particularly in early fall at the time of sporidial infection of white pine, favored the spread of the rust and its establishment on white pines. As may be observed on the accompanying map blister rust is now known to be well established and well distributed throughout practically the entire white pine-growing area in the Lake States. Pine infection is particularly well established in northeastern and east central Minnesota extending into northwestern Wisconsin, through the central portion of Wisconsin into the Upper Peninsula of Michigan. On certain areas near Duluth, Minnesota, the rust has already reached the destructive stage and thousands of young white pine are dead or dying. In Crow Wing County, Minnesota, in a southwesterly direction from Duluth, pine and Ribes infections were found becoming well established over quite large acreages of white pine. In both of these regions in Minnesota white pine stands are relatively abundant and valuable.

In Wisconsin the rust was found for the first time in 1932 on pines in two counties, namely, Wood County in the central portion of the state, and Vernon County in the southwestern portion. It has been found on Ribes in Wisconsin in eight additional counties this year, chiefly in the northwestern and southwestern portions. The finding of the rust on Ribes in Grant County in the extreme southwestern portion of the state is significant as indicating the spread of the rust into Iowa.

In Upper Michigan the severest outbreaks of the disease are located in the central part of the Peninsula near Ishpeming in Marquette County, and Ralph in Dickinson County. Studies made in upper Michigan show that on certain areas as high as 35 per cent of the young trees have already been killed by blister rust.

In the Lower Peninsula of Michigan no severe outbreaks of blister rust on pines have been found. Pine infections are known to have occurred in five counties, but in no instance in lower Michigan has there been found more than one to a few pines infected in any one place. Ribes infection has been found generally distributed over the Lower Peninsula.

In the North Central States limited scouting has shown the rust of infrequent occurrence and in the introductory stage. Aside from diseased pines shipped in from France and infected states, rust has been found in five places in northeastern and northwestern Ohio on Ribes in 1931 and in three points in northeastern and central Iowa on Ribes nigrum in 1929.

GENERAL SUMMARY - BLISTER RUST CONTROL
IN THE LAKE AND NORTH CENTRAL STATES 1932.

SPREAD OF THE RUST.

The year 1932 will probably go down in blister-rust history in the Lake States as a year of widespread rust, the year of origin of large numbers of cankers and new infection centers. Frequent rains throughout the growing period, particularly in early fall at the time of sporadic infection of white pine, favored the spread of the rust and its establishment on white pines. As may be observed on the accompanying map blister rust is now known to be well established and well distributed throughout practically the entire white pine-growing area in the Lake States. Pine infection is particularly well established in northeastern and east central Minnesota extending into northwestern Wisconsin, through the central portion of Wisconsin into the Upper Peninsula of Michigan. On certain areas near Duluth, Minnesota, the rust has already reached the destructive stage and thousands of young white pine are dead or dying. In Crow Wing County, Minnesota, in a southwesterly direction from Duluth, pine and Ribes infections were found becoming well established over quite large areas of white pine. In both of these regions in Minnesota white pine stands are relatively abundant and valuable.

In Wisconsin the rust was found for the first time in 1932 on pines in two counties, namely, Wood County in the central portion of the state, and Vernon County in the southwestern portion. It has been found on Ribes in Wisconsin in eight additional counties this year, chiefly in the northwestern and southwestern portions. The finding of the rust on Ribes in Grant County in the extreme southwestern portion of the state is significant as indicating the spread of the rust into Iowa.

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At one of these points, at Ames, one pine infection was found in 1931. No blister rust occurring naturally, has been found in Indiana or Illinois.

In general blister rust is now so widespread and well established throughout the pine-growing region of the Lake States that it is not possible to expect a young stand of white pine to survive to commercial maturity if Ribes bushes within 900 feet of the stand are allowed to remain.

WHITE PINE ACREAGE IN THE LAKE STATES.

In Table No. 1 there is shown the estimate of acreage of white pine in the Lake States. This estimate is based upon land economic surveys and estimates by the different state conservation departments, Forest Service records, pine surveys by our own office, location of pines in connection with black currant campaigns in Michigan, mapping of white pine by Minnesota district forest rangers, etc.

Table No. 1.

Estimated Acreage of White Pine and Idle Forest Land in the Lake and North Central States. Compiled 1932.

: State :	: Native :	: Planted :	: Total :	: *Idle Forest :
:	: Stands :	: Stands :	:	: Land :
: Illinois :	: 1,200 :	: 400 :	: 1,600 :	: 3,500,000 :
: Indiana :	: 1,000 :	: 700 :	: 1,700 :	: 1,500,000 :
: Iowa :	: 2,000 :	: 400 :	: 2,400 :	: 1,000,000 :
: Michigan :	: 992,816 :	: 34,630 :	: 1,027,446 :	: 6,000,000 :
: Minnesota :	: 1,043,730 :	: ? :	: 1,043,730 :	: 5,500,000 :
: Ohio :	: 53,761 :	: 1,139 :	: 54,900 :	: 1,750,000 :
: Wisconsin :	: 756,315 :	: ? :	: 756,315 :	: 8,000,000 :
: Total :	: 2,850,822 :	: 37,269 :	: 2,888,091 :	: 27,250,000 :

*From "Forestry Almanac" 1933.

PREERADICATION SURVEYS.

During the past few years in the Lake States, we have built up plans and information regarding the costs and methods of performing local control on a fairly large scale. We have such information on several counties in the Upper and Lower peninsulas of Michigan. We have estimated the cost and methods of performing local control on the Ottawa National Forest, Michigan, on the Chippewa National Forest of Minnesota and 3,000 acres of white pine type on the Superior National Forest, Minnesota. During the past field season Ritter, in cooperation with the Minnesota State Forest Service, has been laying plans to initiate local control on a fairly large basis on land owned or controlled by the state. He has also lined up a considerable amount of prospective local control on individuals' lands in Crow Wing County, Minnesota.

In Wisconsin, Kouba has in sight a considerable amount of cooperative control in Waupaca and Door Counties. These cooperative control jobs are lined up by a man going systematically through each county, mapping in pine areas and interviewing owners relative to blister rust control during the next

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State	Native	Planted	Total	*Idle Forest Land
Illinois	1,200	400	1,600	3,500,000
Indiana	1,000	700	1,700	1,500,000
Iowa	2,000	400	2,400	1,000,000
Michigan	922,816	34,630	1,027,446	6,000,000
Minnesota	1,043,730	?	1,043,730	2,500,000
Ohio	53,761	1,139	54,900	1,720,000
Wisconsin	756,315	?	756,315	8,000,000
Total	2,850,822	37,269	2,888,091	27,250,000

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field season.

During the past two years we have received from the Land Economic Surveys in the three Lake States valuable quantitative information on the abundance of Ribes in different timber types in connection with their strip-line data. When this information is worked up it should be possible to obtain a very good preliminary idea as to the cost of performing control on an area provided a timber type map is available.

Another type of work which is becoming more and more important is the going over of prospective white pine planting sites before planting in order to determine whether or not Ribes are abundant on the area. It is possible to dodge excessive cost of blister rust control by not planting white pine on areas supporting heavy Ribes growth. Fortunately many thousands of acres of excellent white pine planting sites supporting aspen and oak but few if any Ribes, exist in the Lake States. Ritter in Minnesota has been training the Minnesota State Forest Service men to look over their areas for Ribes. He has prepared a manual along this line for the use of the district rangers. Wisconsin and Michigan state leaders have also been active in examining prospective white pine planting sites for Ribes.

LOCAL CONTROL

The general organization for control work in each of the Lake States is as follows: The work is organized under a cooperative agreement between the designated state agency and the U. S. Department of Agriculture through its Division of Blister Rust Control. The work is performed under the administrative direction of the state agency. The Federal Government pays the salary and usually the expenses of a man who assumes direct supervision of the blister rust control program under the administrative direction of the state. The state leader lines up control jobs. The labor to pull Ribes is furnished by the owner. Foremen to directly supervise the owner's labor in protecting his pine stands are furnished by the state.

In Table No. 2 there is shown in summary form a statement of all control operations performed in the Lake States to and including 1932.

The large amount of white pine acreage remaining to be protected in the Lake States is quite strikingly brought out when Table No. 1 and Table No. 2 are compared. It may be observed that we have furnished initial protection to date to only slightly over 1 per cent of the estimated white pine acreage. That good progress has been made this year is evidenced from Table No. 2 where it may be observed that of the total amount of white pine acreage initially protected to date, practically 1/3 of it was done this year.

Although there was approximately the same number of Ribes per acre found in 1932 as the average for 1918 to 1932, the cost per acre in 1932 was less than 60 per cent of the average cost from 1918 to 1932. This decreased cost was due partly to more efficient methods of Ribes eradication and partly to lower wages paid in 1932.

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Table No. 2

Summary of Ribes Eradication, Lake States Region.

1918-1932.

	Acreage Pine Protected:		Acreage Worked:		Total Ribes Pulled		Total Cost		Cost Per Acre		Ribes Per Acre	
	1918-	1932	1918-32	1932	1918-32	1932	1918-32	1932	1918-32	1932	1918-32	1932
State	12,613	5,364	40,191	17,291	2,303,807	1,171,711	\$20,907.20	\$7,038.79	\$.52	\$.41	57	6
Michigan	2,270	124	7,383	194	656,531	26,075	16,278.95	166.95	2.21	.86	89	13
Minnesota	21,528	6,296	52,194	18,457	4,018,774	1,350,227	28,323.98	6,079.12	.54	.33	77	7
Wisconsin	260	260	1,958	1958	202,635	202,635	1,051.24	1,051.24	.54	.54	103	10
Illinois	36,671	12,044	101,726	37,900	7,181,747	2,750,648	\$66,561.37	\$14,336.10	\$.65	\$.38	71	7
Totals												

The high average cost of \$2.21 per acre in Minnesota was due to the fact that during the years 1918 to 1921, when most of the protection work was done in that state, a large part of the cost went to cutting out cankers as well as pulling Ribes, in the hope of eradicating the disease itself.

USE OF UNEMPLOYMENT RELIEF FUNDS ON CONTROL PROJECTS.

The relatively large amount of local control work performed in 1932 is due in a great measure to the use of unemployment relief funds furnished by counties and municipalities to give employment to their citizens out of work. The use of county and municipal relief funds for the employment of labor on local control projects was principally limited to Wisconsin and Michigan. Ribes eradication work as a means of furnishing labor to unemployed is ideal in that all of the expenditures go for labor. No equipment is necessary.

In Table No. 3 is shown the summary of the use of relief labor on blister rust control projects during 1932.

In general the use of relief labor worked out very well on control projects. On many areas efficient work in pulling Ribes was performed. In a few instances very poor work was done. In general, best results were obtained when the men were paid cash instead of credit. The poorest work done was that at Superior, Wisconsin where credit was given for relief already obtained by the men.

In Wisconsin a slightly different type of unemployment relief was afforded. At the beginning of the season there were approximately 400 separate control jobs lined up in Shawano and Waupaca Counties. There was not sufficient state money to furnish foremen for these jobs. Mr. Kouba, State Leader of Wisconsin, made arrangements with the proper county authorities whereby one man per township from the list of unemployed was used. This man continued to receive an equivalent of \$1 per day from the county and was paid in cash by the state \$1 a day plus gas and oil for the use of his car when on official business. After a training camp of some 8 or 10 days nine of these men were used. Each man supervised the owners' labor in his particular township in performing control. Each owner furnished one or more men according to the amount of white pine acreage there was to protect. This whole project was in charge of a trained man who contacted each crew each day. This plan was very successful. The men took a personal interest in their jobs and did excellent work.

BLACK CURRANT ERADICATION.

The only systematic black currant eradication work in the Lake States is being done in Michigan. Here an effort is being made to rid all of the white pine-growing counties of the cultivated black currant. Previous to 1932 15 counties were completed. In 1932 four counties were completed and one county nearly so. Results to date in cultivated black currant eradication work in Michigan are as follows: There have been found 2,965 locations containing 31,849 bushes destroyed. Practically all of these black currants were in 20 counties. A few of them were pulled in connection with cooperative control.

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BLACK CURRENT ERADICATION.

The only systematic black current eradication work in the Lake States is being done in Michigan. Here an effort is being made to rid all of the white pine-growing counties of the cultivated black current. Previous to 1932 15 counties were completed. In 1932 four counties were completed and one county nearly so. Results to date in cultivated black current eradication work in Michigan are as follows: There have been found 2,962 locations containing 31,849 bushes destroyed. Practically all of these black currents were in 30 counties. A few of them were pulled in connection with cooperative control.

Use of Relief Labor on Blister Rust Control Projects, Lake States Region, 1932.

State	Type of Project	Acres	Number of Men Employed	Days Worked	By Whom	Payment		Quality of Work-Remarks
						How Paid	Rate Per Day	
Illinois	State Park	608	8	128	State	Cash	\$4.00	Excellent
								Poor to fair. Man under supervision of trained foreman.
	City of					Food		Men working to pay for past
Upper	Escanaba	1,750	20	391	City	Orders	\$2.40	relief. Not satisfactory
Michigan	Various tracts							Good. Cash payment keeps up morals of
	in Marquette							
	County	1,775	71	542	County	Cash	\$2.56	men
	City parks in							One fair, one good after
	three cities	1,024	13	73	City	Cash	\$2.40	second working, one good.
	City parks in							
Lower	one city	403	10	36	City	Scrip	\$3.20	Good.
Michigan	City parks in							
	one city	500	4	28	City	Credit	\$2.40	Good.
	131 pine owners				(State	Cash	\$1.00	Excellent. These men acted as
	1 nursery	13,746	10	1,168	(County	Credit	\$1.00	foremen supervising owners'
								labor. All work under direction of trained state foreman.
	3 State Parks	3,547	21	832½	State	Cash	\$2.40	Good.
Wisconsin								Poor. Credit given for past
								relief. Men wanted dole.
								Ribes heavy. 1,267 bushes to
	City Park							the acre. Necessary to work
	Superior	64	32	262	City	Credit	\$4.00	portions 2 and 3 times.
	Totals	23,417	189	3,460½				\$8,587.52

The black currant eradication as performed in Michigan is very much worth while. In addition to the major purpose of the elimination of the cultivated black currant in pine-growing counties, the men scout for the rust, locate and map pine areas, interview owners regarding cooperative control, and disseminate knowledge regarding blister rust and its control. The principle is worked upon in Michigan that efforts to perform local control should be limited to those counties from which the cultivated black currant has been removed. It is believed that the removal of wild Ribes close to the stand does not constitute protection unless the cultivated black currants within infecting distance have also been removed.

NURSERY SANITATION.

Practically all of the large white pine-growing nurseries in the three Lake States are in state or Federal ownership. One pulp company in Wisconsin owns a nursery for growing forest trees. These nurseries have all been given blister rust protection and they will be checked over each year for Ribes. In general, nurseries growing forest trees in the Lake States are in a sanitary condition so far as blister rust control goes.

There are three state nurseries in Ohio, three in Indiana and one in Iowa producing white pines for reforestation and shelterbelt purposes. These have not been protected but their sanitation is contemplated in the near future.

COSTS.

See Table No. 4, next page.

CONCLUSION.

In spite of the depression, or perhaps on account of it, we have finished our most successful season of furthering the cause of blister rust control in the Lake States. In view of the fact that we have afforded initial protection to only slightly over one per cent of the white pine acreage, it is evident that we have barely begun the job. The future of white pine in the Lake States is tremendous if such stands can be safeguarded to maturity. If we can make use of unemployed labor to the fullest extent in furnishing protection against blister rust to existing and future white pine stands, we can feel that we are not only offering worth-while jobs to the unemployed, but that the project is self-liquidating in the fullest sense of the word.

The black current eradication as performed in Michigan is very much worth while. In addition to the major purpose of the elimination of the cultivated black current in pine-growing counties, the men scout for the rust, locate and map pine areas, interview owners regarding cooperative control, and disseminate knowledge regarding blister rust and its control. The principle is worked upon in Michigan that efforts to perform local control should be limited to those counties from which the cultivated black current has been removed. It is believed that the removal of wild Ribes close to the stand does not constitute protection unless the cultivated black currents within infesting distance have also been removed.

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Table No. 4.

Costs of Blister Rust Control, Lake and Central States Region
Jan. 1 to Dec. 31, 1932.

Agency	Unassigned:	Investigation:	Michigan:	Wisconsin:	Minnesota:	Ohio	Indiana:	Illinois:	Iowa	Total
Milwaukee										
Office	\$ 2079.30	\$ 916.76	\$ 463.43	\$ 325.85	\$ 177.23	\$ 24.08	\$ 26.33	\$ 377.22	\$ 153.67	\$ 4553.92
Federal (In										
each State)	-	-	7609.67	3302.13	2543.55	-	-	-	-	13255.35
State	-	-	8817.51	8920.31	1619.84	-	-	864.07	60.80	20282.53
Total	2079.30	916.76	16895.61	12543.29	4140.67	24.08	26.33	1241.29	219.47	38091.80

Jan. 1 to Dec. 31, 1938.

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BLISTER RUST CONTROL, MICHIGAN

1932

HISTORY OF WORK.

Blister rust work in Michigan started in the summer of 1917 when three or four temporary men were employed scouting for the rust particularly on imported nursery stock. Infection was first found in 1917 in Oakland County on seedling white pines imported from France.

From 1917 to 1926, inclusive, blister rust work was restricted to a limited amount of scouting for infection on Ribes and pines by temporary employees during the summer months. In 1927 a permanent agent was appointed to take charge of all blister rust work in the state.

In 1928 the first cooperative control project was initiated. The cooperative control money was obtained from a town appropriation and some individual cooperation.

In 1929 the state legislature established a definite blister rust control law and made available \$20,000 for this work during each of the ensuing two years. As a result of the increased money available for the work, an additional permanent agent was appointed during the latter part of 1929 and two more permanent men were added to the force in July, 1930.

In 1931, due to personnel changes and to decreased funds the permanent blister rust control organization was reduced to two agents.

ORGANIZATION.

Since July, 1931 blister rust control in Michigan has been headed up by Mr. E. C. Mandenberg, in charge of Orchard and Nursery Inspection who is acting state blister rust control leader, with headquarters at Lansing.

Mr. Mandenberg's salary is furnished by the state and his expenses, while on blister rust work, are furnished either by the state or Federal government.

Two permanent, full-time agents are employed, one in charge of work in the Upper Peninsula and one in the Lower Peninsula. The duties of these two agents are to supervise directly all control activities in their respective districts. Assisting the agent in the Upper Peninsula for 1932, there were two temporary Federal agents acting as foremen of eradication crews and one carrying on black currant eradication. On July 1 these three men were transferred to the state payroll and on July 15 two more state inspectors went to work in the Upper Peninsula both on black currant eradication. All inspectors except one were laid off on September 10 on account of shortage of funds. The one remaining was put on the Federal payroll and worked for one additional month as a foreman of eradication crews.

In lower Michigan one temporary Federal agent had charge of black currant eradication work and three temporary Federal agents had charge of wild Ribes eradication work. Two temporary state inspectors had charge

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of black currant eradication work. After July 1 all of these men were placed on the state payroll. Due to shortage of funds all of these men were laid off on September 10.

STATUS OF THE RUST.

Blister rust was just discovered in 1917 in an Oakland County nursery on pines imported from Europe.

It is now well distributed throughout the white pine-growing area of Michigan. At the end of the 1932 field season, as is shown in Table No. 5, rust was known to be present on white pines, Ribes, or both in a total of 45 counties, in 11 of which it was found on white pines.

The severest outbreak of the disease is in Marquette and Dickinson Counties in the Upper Peninsula. In sample plots in these two counties 75% of the trees have been found infected, with 35% of the young trees already dead.

Black currants were abundant in these counties before a campaign for their elimination was made and they were undoubtedly the chief factor in causing the severe outbreak of the rust.

In Lower Michigan, due probably to the smaller frequency of Ribes, the rust on pines has not been found in great abundance. In none of the known pine infection spots has the disease reached the damage stage. For the most part only one to a few pines in each spot have been found infected. It is interesting to note that all of the six counties known to have pine infection are close to either Lake Huron or Lake Michigan.

of black currant eradication work. After July 1 all of these men were placed on the state payroll. Due to shortage of funds all of these men were laid off on September 10.

STATUS OF THE RUST.

Blister rust was first discovered in 1917 in an Oakland County nursery on pines imported from Europe.

It is now well distributed throughout the white pine-growing area of Michigan. At the end of the 1932 field season, as is shown in Table No. 5, rust was known to be present on white pines, larches, or both in a total of 45 counties, in 11 of which it was found on white pines.

The severest outbreak of the disease is in Marquette and Dickinson Counties in the Upper Peninsula. In sample plots in these two counties 75% of the trees have been found infected, with 35% of the young trees already dead.

Black currants were abundant in these counties before a campaign for their elimination was made and they were undoubtedly the chief factor in causing the severe outbreak of the rust.

In Lower Michigan, due probably to the smaller frequency of larches, the rust on pines has not been found in great abundance. In none of the known pine infection spots has the disease reached the damage stage. For the most part only one to a few pines in each spot have been found infected. It is interesting to note that all of the six counties known to have pine infection are close to either Lake Huron or Lake Michigan.

Table No. 5.

Infected Counties in Michigan Classified According to Year Infection First Found.1932.

Year Ribes : Infection : First Found:	Ribes : Infection : Only	<i>Year Pine Infection First Found</i>								Total
		1917	1922	1928	1929	1930	1931	1932		
Before 1927:		Oakland	Kent							2
1927	Cass						Oceana			
	Macomb									
	St. Clair									
	Lapeer									
	Genesee									
	Tuscola									
	Sanilac									
	Huron									
	Saginaw									
	Bay									
	Midland									
	Isabella									
	Moscota									
	Osceola									
	Clare									
	Missaukee									17
1928	Montcalm			Cheyboygan			Iosco			
	Newaygo									
	Gladwin									
	Roscommon									
	Charlevoix									7
1929	Grand Traverse				Marquette*					
	Delta*				Dikinson*					
	Keweenaw*									
	Gogebic*									6
1930	Alcona					Menomonee*				
						Baraga*				3
1931	Alpena						Iron*			
	Chippewa*									3
1932	Manistique							Mason		
	Benzie									
	Leelanau									
	Antrim									
	Ontonagan*									
	Houghton*									
All Years	34	1	1	1	2	2	3	1		45

*Upper Peninsula Counties.

Infected Countries in Michigan Classified According to Year Infected First Found.

[illegible]

Upper Peninsula Counties.

WHITE PINE ACREAGE.

In Table No. 6 there is shown by counties the best information available on the extent and distribution of white pine stands in Michigan.

Table No. 6.

Estimated Acreage of White Pine in Michigan - Upper Peninsula.

County	Good Stands		Scattered:	White Pine		Source of Information
	Native	Planted on: State Land:		White Pine	Planting Sites	
Alger	500	:	:	1,500	50,000	:Observations by agents.
Baraga	100	:	:	500	5,000	: " " " "
Chippewa	300	:	:	1,500	50,000	: " " " "
Delta	1,500	:	:	1,000	50,000	:White Pine Survey 1931
Dickinson	1,320	:	:	1,200	35,000	: " " " "
Gogebic	115	:	:	926	:	: " " " "
Houghton	500	:	:	500	15,000	:Observations by Agents
Iron	12,500	:	:	25,000	40,000	:W.P. Survey 1931
Keweenaw	:	:	:	500	5,000	:Observations by agents
Luce	500	150	:	1,000	50,000	:Observation by Agents. State records 1931.
Mackinac	300	790	:	500	50,000	: " " " "
Marquette	9,068	:	:	15,000	50,000	:White Pine Survey, 1931
Menominee	1,000	:	:	1,500	50,000	: " " " "
Ontonogon	12,000	:	:	15,000	10,000	:Observation by Agents.
Schoolcraft	83	:	:	25,000	40,000	:White Pine Survey 1931
Totals-Upper Peninsula	39,786	940	:	90,626	500,000	:

Lower Peninsula.

Alcona	187	:	:	3,374	:	:Cartographic Survey Inter-
	:	:	:	:	:	:vier Cards.
Allegan	30	:	:	:	:	:Planting Record.
Alpena	914	3,190	:	:	:	:Cart.Survey.State Records 1931
Antrim	698	:	:	1,620	30,000	:White Pine Survey 1932
Arenac	895	:	:	:	:	:Cart.Survey
Barry	72	:	:	:	:	: " " "
Bay	10	:	:	:	5,392	: " " Interview Cards.
Benzie	1,454	:	:	4,785	20,000	:White Pine Survey, 1932
Berrien	8	:	:	:	:	:Planting Record
Branch	5	:	:	:	:	: " " "
Calhoun	20	:	:	:	:	: " " "
Cass	6	:	:	:	:	:Cart. Survey
Charlevoix	950	480	:	962	10,640	:White Pine Survey 1932, State Records 1931
Cheboygan	48,696	2,030	:	89,449	:	:Cart.Survey.State Records 1931
Clare	12	:	:	59,981	:	: " " Interview Cards.
Clinton	12	:	:	:	:	: " " "
Crawford	1,755	2,140	:	:	:	: " " State Records 1931.

WHITE PINE ACREAGE.

In Table No. 6 there is shown by counties the best information available on the extent and distribution of white pine stands in Michigan.

Table No. 6.

Estimated Acreage of White Pine in Michigan - Upper Peninsula.

County	Native	State Land	White Pine	Planting	Scattered White Pine	Good Stands	Source of Information
Alcona	500	:	1,500	:	50,000	:	Observations by agents.
Alcona	100	:	500	:	5,000	:	"
Alcona	300	:	1,500	:	50,000	:	"
Alcona	1,500	:	1,000	:	50,000	:	White Pine Survey 1931
Alcona	1,500	:	1,200	:	35,000	:	"
Alcona	115	:	325	:	:	:	"
Alcona	500	:	500	:	15,000	:	Observations by agents
Alcona	12,500	:	25,000	:	40,000	:	W.P. Survey 1931
Alcona	:	:	500	:	5,000	:	Observations by agents
Alcona	500	150	1,000	:	50,000	:	Observation by Agents, State
Alcona	:	:	:	:	:	:	Records 1931.
Alcona	300	750	500	:	50,000	:	"
Alcona	9,068	:	15,000	:	50,000	:	White Pine Survey, 1931
Alcona	1,000	:	1,500	:	50,000	:	"
Alcona	12,000	:	15,000	:	10,000	:	Observation by Agents
Alcona	83	:	25,000	:	40,000	:	White Pine Survey 1931
Alcona	32,786	940	20,622	:	500,000	:	

Lower Peninsula.

Alcona	187	:	3,374	:	:	:	Cartographic Survey Inter-
Alcona	:	:	:	:	:	:	view Cards.
Alcona	50	:	:	:	:	:	Planting Record.
Alcona	914	3,190	:	:	:	:	Cart. Survey, State Records 1931
Alcona	638	:	1,620	:	30,000	:	White Pine Survey 1931
Alcona	825	:	:	:	:	:	Cart. Survey
Alcona	72	:	:	:	:	:	"
Alcona	10	:	:	:	5,323	:	" Interview Cards.
Alcona	1,454	:	4,785	:	20,000	:	White Pine Survey, 1931
Alcona	8	:	:	:	:	:	Planting Record
Alcona	5	:	:	:	:	:	"
Alcona	20	:	:	:	:	:	"
Alcona	6	:	:	:	:	:	Cart. Survey
Alcona	950	480	963	:	10,640	:	White Pine Survey 1931
Alcona	:	:	:	:	:	:	State Records 1931
Alcona	48,636	2,030	82,443	:	:	:	Cart. Survey, State Records 1931
Alcona	12	:	52,921	:	:	:	" Interview Cards.
Alcona	12	:	:	:	:	:	"
Alcona	1,755	2,140	:	:	:	:	" State Records 1931.

Table No. 6 - (Continued)

County	Good Stands		Scattered: White Pine:		Planting Sites	Source of Information
	Native	State Land	Pine	White		
Eaton	13:					:Planting Record
Emmet	420:	300:	1,290:	6,000:		:W.P.Survey 1932.State Rec.1931
Genesee	5,530:		15,461:			:Cart.Survey
Gladwin	514:		7,071:			: " "
Grand Traverse	7,805:	7,750:	1,960:	16,000:		:W.P.Survey 1932.State Rec.1931
Gratiot	87:					:Cart.Survey
Hillsdale	42:					: " "
Huron	567:					:Interview Cards
Ingham	449:					:Cart.Survey
Ionia	1:					:Interview Cards
Iosco	2,210:		37,800:			:Black Currant Erad.1930
Isabella	1,550:		677:			:Cart.Survey
Jackson	40:					:White Pine Scouting 1932
Kalamazoo	40:					:Interview Cards, 1932
Kalkaska	800:	810:	18,409:			:Cart.Survey.State Rec.1931
Kent	53:		497:			: " " Scouting 1932
Lake	500:					:Conservation Dept.1932
Lapeer	293:		2,181:			:Cart.Survey
Leelanau	826:		2,591:			:White Pine Survey, 1932
Lenawee	296:		613:			:Cart.Survey
Livingston	-	-	-	-	-	: -
MaComb	50:					:Interview Cards
Manistee	553:		2,838:	100,000:		:White Pine Survey, 1932
Mason	1,748:		1,492:	100,000:		: " " " "
Mecosta	650:		3,510:			:Cart.Survey
Midland	835:		1,000:			:White Pine Survey 1932
Missaukee			71,819:			:Cart.Survey
Monroe	16:		41:			: " "
Montcalm	31,350:					:Black Currant Erad.1929
Montgomery	30:	1,810:	57,955:			:Cart.Survey.State Rec.1931
Muskegon	9,310:		10,540:			:Black Currant Erad.1930-31
Newaygo	35,845:		2,682:			: " " " " 1929
Oakland	266:					:Interview Cards
Oceana	770:		10,593:			:Black Currant Erad.1931
Ogemaw	13:	1,730:				:Cart.Survey.State Rec.1931
Osceola	169:		24,739:			: " "
Oscoda	42,565:	310:	21,033:			: " " " " "
Otsego	570:	3,640:	7,470:			: " " " " "
Ottawa	177:					:Observations of Agents 1932
Presque Isle	580:	1,710:				:Cart.Survey.State Rec.1931
Roscommon	21,672:	7,790:	79,435:			: " " " " "
Saginaw	42:		11,603:			: " " Interview Cards.
St.Clair	7,360:		8,634:			: " " " "
St.Joseph						: " " " "
Sanilac	2,298:		31,050:			:Cart.Survey
Shiawassee	10:		1,168:			: " " Interview Cards
Tuscola	26:		31,283:			: " " " "
VanBuren	24:					: " "
Washtenaw	76:					:Interview Cards.
Wayne	23:					:Cart.Survey
Wexford	10:					: " "
Totals-LowerPen:	234,798:	33,690:	627,606:	288,032:		
Grand Total	274,584:	34,630:	718,232:	788,032:		

County	Native	State Land	Pine	Planted on White	Planted on White	Planted on White	Source of Information
Wexford	10:						
Wayne	23:						
Washington	76:						
Van Wert	24:						
Lascelles	26:						
Shiawassee	10:						
Sanilac	2,298:						
St. Joseph	-						
St. Clair	7,360:						
Saline	42:						
Roscommon	21,672:						
Presque Isle	280:						
Ottawa	177:						
Ontonagon	2,640:						
Oscoda	42,565:						
Oscoda	169:						
Genaw	13:						
Ocean	770:						
Oakland	266:						
Newaygo	32,845:						
MacKegon	9,210:						
Montgomery	30:						
Montcalm	21,320:						
Monroe	16:						
Missaukee							
Midland	835:						
Macosta	650:						
Macomb	1,748:						
Manistee	253:						
Macomb	50:						
Livingston	-						
Lenawee	296:						
Leelanau	826:						
Lapeer	293:						
Lake	500:						
Kent	23:						
Kalamazoo	40:						
Jackson	40:						
Isabella	1,250:						
Loogo	2,210:						
Ionis	1:						
Ingham	49:						
Huron	267:						
Hillsdale	42:						
Gratiot	87:						
Grand Traverse	7,305:						
Gladwin	514:						
Genesee	2,230:						
Emmet	420:						
Easton	13:						
Grand Total	274,584:	34,630:	718,232:	288,032:			
Totals-Lower Peninsula	234,798:	32,690:	627,606:	288,032:			

In 1928 a cartographical survey was made in Michigan for the purpose of finding out how much acreage of white pine existed in Michigan. To obtain this information all records possible were searched. Information was obtained from the Conservation Department, county records, lumbermen, old-timers, etc. Naturally the information was not very accurate or complete.

In order to plan an intelligent control program, it is essential that the locations and extent of all white pine stands in the state be known. Accordingly during the winter months of 1930-1931 and 1931-1932, the two permanent agents in Michigan worked in various counties locating and mapping in all stands of white pine by counties. All roads possible were covered and the extent and limits of white pine areas located on a large-scale county map. Notes were made on the age class and abundance of the white pine stands and where possible the owners were interviewed either personally or by letter in regard to protection of such stands against blister rust. A sharp look-out was kept for blister rust and where snow conditions permitted, Ribes conditions were noted.

In Table No. 6 the pine stands found are classified as "good stands" or "scattered white pine". The "good stands" are further subdivided into native and planted on state land. The definition of a good stand is very general. A "good stand" is one which is well stocked with white pine and which unquestionably is worth protecting against blister rust.

"Scattered white pine" refers to areas on which the white pine are scattered and may or may not warrant protection costs. In general scattered white pine stands should be considered as a potential white pine stand.

"White pine planting sites" are those areas which, in the opinion of the agent, are well suited for the planting of white pine. A white pine planting site would be one having a sandy to loamy soil supporting a medium amount of deciduous brush such as aspen or birch. Usually Ribes are scarce or abundant on such areas. In Table No. 6 there are less than a million acres of white pine planting sites shown. Undoubtedly a much larger number of acres of this type exist. As time goes on and as more land economic surveys and white pine surveys are completed, the information on the location and extent of white pine acreages will become more accurate.

PREERADICATION SURVEYS.

A considerable amount of surveys in preparation for making actual eradication plans have been made, principally on the Ottawa National Forest in upper Michigan and on white pine plantings on state lands in lower Michigan. Maps have been made showing the location of white pine, the location and amount of acres necessary to be covered by crew work, and the location and extent of areas which need only scouting. In lower Michigan several thousands of acres supporting white pine plantings have been scouted and pronounced Ribes-free. These areas, however, are not included among areas protected until the necessary crew work has been completed. The pre-eradication work done to date is shown in Table No. 7

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Table No. 7.

Pre-Eradication Surveys, Michigan, to 1932 Inclusive.

Year of Pre- : Acreage :					
Eradication	of	Total area to be covered (acres)			
Survey	:White Pine:	By Scout	: By Crew	: Total	
1930	: 10,915	: 42,764	: 2,116	: 44,880	
1931	: 13,677	: 1,920	: 15,273	: 17,193	
1932	: 247	: 417	: 748	: 1,165	
All Years	: 24,839	: 45,101	: 18,137	: 63,238	

*In addition 1810 acres covered by pre-eradication survey in 1930 were again looked at in 1931 because our results did not coincide with results from Land Economic Surveys. The re-check in 1931 showed Ribes on areas marked as "Ribes-free" in 1930.

The work done in 1930 and 1932 was in the Lower Peninsula. In 1931 14,893 out of 17,193 acres were in Upper Michigan and 100% was listed as crew work. In Lower Michigan less than 7% was shown as requiring crew work.

Another type of work which can be classified as pre-eradication is the inspection for Ribes of areas proposed to be planted to white pine. A certain amount of this kind of work has been done, particularly on the Huron National Forest.

During the summers of 1931 and 1932, the Office of Land Economic Survey has cooperated very completely and has given us information on the abundance of Ribes in different timber classifications and has taken counts of Ribes in connection with their strip surveys. This information, although not yet worked up, will be of great value in the development of Ribes types.

RIBES ERADICATION.

In Tables Nos. 8 and 9 there are shown complete records of co-operative local control performed in Michigan during 1932.

Pre-Eradication Surveys, Michigan, to 1932 inclusive.

Year of Pre- Eradication	Survey	White Pine	By Scout	By Crew	Total	Total area to be covered (acres)
All Years	24,839	42,101	18,137	63,238		
1932	347	417	748	1,192		
1931	13,677	1,920	15,373	17,193		
1930	10,915	42,764	3,116	44,880		

*In addition 1810 acres covered by pre-eradication survey in 1930 were again looked at in 1931 because our results did not coincide with results from Land Economic Surveys. The re-check in 1931 showed Ribes on areas marked as "Ribes-free" in 1930.

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RIBES ERADICATION.

In Tables Nos. 8 and 9 there are shown complete records of co-operative local control performed in Michigan during 1932.

Table No. 8.

Cooperative Local Control. Initial Work, Michigan 1932.
 (Exclusive of costs of cutting cankers in Upper Michigan
 \$125.48)

(Upper Michigan)												
County	No. of Jobs	Acres: Pine Prot.	Acres: Worked	Ribes Pulled Wild	Cultivated	(1)	Labor	State	Federal	Total	Costs	Per Acre
Menominee	1	79	192	11258	17	\$ 224.40	2.74	127.26	354.40	1.85	585	
Marquette	8	1183	3268	363335	0	1524.12	308.31	305.40	2137.83	.65	111	
Delta	6	1104	3115	318382	40	1105.45	361.94	343.20	1810.59	.58	102	
Sub-Totals	15	2366	6575	793975	57	2853.97	672.99	775.86	4302.82	.65	121	
(Lower Michigan)												
Antrim	3	40	207	7441	133	63.00	31.93	70.26	165.19	.80	37	
Benzie	1	130	340	59769	0	318.10	24.21	52.83	395.14	1.16	176	
Charlevoix	1	30	62	7795	0	21.00	28.45		49.45	.80	127	
Crawford ⁽²⁾	1	100	90	73315	0	94.50	0	90.06	184.56	2.05	815	
Gr. Traverse	13	828	2617	28395	20	222.97	194.44	69.43	486.84	.19	11	
Ingham	2	5	180	2152	26	24.30	0	36.67	60.97	.34	12	
Iosco	2	400	1135	1002	0	9.60	0	33.16	42.76	.04	1	
Kalamazoo	1	30	200	12771	0	37.03	0	43.02	80.05	.40	64	
Kent	1	11	90	550	0	10.80	0	12.65	23.45	.26	6	
Leelanau	2	60	375	15886	0	45.20	70.42	6.26	121.88	.33	43	
Manistee	3	45	360	184	0	15.00	2.81	6.26	24.07	.07	1	
Mason	13	837	2492	8352	14	77.20	105.04	1.20	183.44	.07	3	
Midland	5	235	754	37262	54	159.30	4.63	212.01	375.94	.50	49	
Montcalm	2	100	340	103765	14	40.75	0	84.14	124.89	.37	305	
Muskegon	2	40	151	10	120	18.90	4.62	13.12	36.64	.24	1	
Newago	1	30	160	0	0	2.00	0	7.37	9.37	.06	0	
Ottawa	2	77	743	11083	0	93.60	0	102.90	196.50	.26	15	
Sub-Totals	55	2998	10296	369732	381	1253.25	467.75	840.14	2561.14	.25	36	
Gr. Totals	70	5364	16871	1163707	438	4107.22	1140.74	1616.00	6863.96	.41	69	

(1) Labor costs to individuals, cities, counties or State.

(2) Hartwick Pines. Part worked previous to 1932.

Labor costs to individuals, cities, counties or State.
(Hartwick Pines. Part worked previous to 1932.)

Table No. 8.
Exclusive of costs of cutting cankers in Upper Michigan
Cooperative Local Control. Initial work, Michigan 1932.
(\$125.48)

Totals : 70 : 2364 : 16871:1163707 : 438 : 4107.32:1740.74:1616.00:6863.96 : 41 : 69											
-Totals : 55 : 2366 : 10266 : 369732 : 381 : 1953.22 : 467.73 : 840.14:2561.14 : 35 : 36											
aws	2	77	743	11082	0	22.60	0	102.90	196.50	26	15
ago	1	30	160	0	0	2.00	0	7.27	9.27	06	0
kegon	2	40	151	10	120	18.90	4.62	13.12	36.64	24	1
teelm	2	100	340	103732	14	40.75	0	84.14	124.29	27	305
land	2	235	754	37262	24	129.30	4.63	212.01	275.94	20	49
on	13	827	2492	8252	14	77.20	102.04	1.20	183.44	07	3
istee	3	45	360	184	0	12.00	2.81	6.26	24.07	07	1
lanan	2	60	372	12886	0	42.20	70.42	6.26	121.88	33	43
t	1	11	90	250	0	10.80	0	12.62	22.42	26	6
amazon	1	30	200	12771	0	27.03	0	42.02	80.05	40	64
co	2	400	1132	1002	0	9.60	0	32.16	42.76	04	1
gham	2	2	180	212	26	24.20	0	36.67	60.97	24	12
Traverse	13	823	2617	28322	20	222.97	194.44	69.43	486.84	19	11
(2) Ford	1	100	90	73212	0	94.20	0	90.06	184.26	2	02
Arlevok	1	20	62	7792	0	21.00	22.42	:	49.42	80	127
zie	1	120	349	29769	0	218.10	24.21	52.82	392.14	1	16
rtin	3	40	207	7441	123	63.00	21.92	70.26	162.19	20	27
(Lower Michigan)											
-Totals : 12 : 2366 : 6272 : 73922 : 27 : 2823.27 : 672.99 : 772.86 : 4202.82 : 62 : 121											
ta	6	1104	2112	213322	40	1102.42	261.94	243.20	1210.29	28	102
quette	8	1182	3268	263322	0	1224.12	208.21	202.40	2127.82	62	111
ominee	1	79	192	112222	17	224.40	2.74	127.26	224.40	1	222
County Jobs: Prot.: Worked: Wild: Invested: Labor: State: Federal: Total: Costs: Ribs											
: of Pine : Acres : : Ribs Pulled : : Costs : : Per Acre :											
(Upper Michigan)											

Summary of Local Control, Initial Work, Michigan, 1932.
(Including Cost of Canker Cutting in Upper Peninsula, \$125

Region	Cooperator	No. Acres	Acres	Jobs	Prot.	W.P.	Worked	Wild	Cult.	Indiv.	Towns	Counties	State	Federal	Total	Costs	Ribes	Pulled	Per Acre
Upper Peninsula	Individuals	6	837	2060				86630	0	\$ 361.00	0	0	8.20	236.34	605.54	0.294	42.1		
	Towns	1	837	2430				223034	40	0	938.95	0	280.66	343.20	1562.81	0.643	91.8		
	Counties	7	639	1972				480266	17	0	1590.74	0	397.17	215.92	2203.83	1.118	243.6		
	State	1	3	113				4045	0	0	0	0	5.23	27.00	56.12	0.497	35.8		
	Total	15	2366	6575				793975	57	361.00	938.95	1590.74	715.15	822.46	4428.30	0.674	120.8		
Lower Peninsula	Individuals	39	2047	6949				129632	145	748.33			321.03	379.28	1448.64	0.208	18.7		
	Towns (7)	13	647	2437				164708	210		389.32		146.72	327.37	863.41	0.354	67.7		
	State	2	104	210				75292	26				115.60	120.99	236.59	1.127	358.7		
	Federal	1	200	700				100	0						12.50	0.018	0.1		
	Total	55	2998	10296				369732	381	748.33	389.32		583.35	840.14	2561.14	0.249	35.9		
Entire State	Individuals	45	2934	9009				216262	145	1109.33	0	0	329.23	615.62	2054.18	0.228	24.0		
	Towns 8	14	1484	4867				387742	250	0	1328.27	0	427.38	670.57	2426.22	0.499	79.7		
	Counties 2	7	639	1972				480266	17	0	0	1590.74	397.17	215.92	2203.83	1.118	243.6		
	State	3	107	323				79337	26	0	0	0	144.72	147.99	292.71	0.906	245.7		
	Federal	1	200	700				100	0	0	0	0	0	12.50	0.018	0.1			
	Total	70	5364	16871				1163707	438	1109.33	1328.27	1590.74	1298.50	1662.60	6989.44	0.414	69.0		

a. State Prison Labor on State Prison grounds.

b. State labor on Michigan State College Pine-tum and Hartwick Pines State Park.

384. 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

[illegible][illegible]

A decided difference in the type of eradication work performed in upper and lower Michigan is evident. The average number of acres worked in upper Michigan per job was approximately 438 acres, while in the lower peninsula it was approximately 187 acres.

To protect one acre of pine in upper Michigan, it was necessary to work approximately 2.8 acres, while in lower Michigan it required 3.4 acres, indicating that the pine stands in lower Michigan were smaller and more widely separated, thus requiring a higher proportion of protecting strip than in upper Michigan.

In upper Michigan an average of 121 Ribes per acre was found as contrasted to an average of 36 in lower Michigan -- nearly $3\frac{1}{2}$ times as many. This greater abundance of Ribes in upper Michigan is directly reflected in Ribes eradication costs. In lower Michigan the average cost per acre was 25¢ as opposed to 65¢ in upper Michigan or 2.6 times as much in upper Michigan.

No second eradication work was done in the Upper Peninsula. That performed in lower Michigan is shown in Table No. 10.

Table No. 10

Cooperative Local Control, 2nd Eradication,
Michigan-1932.
Lower Michigan. All on State Land.

	:No.:	:Acres:	:Ribes Pulled:			Costs			:	Per Acre		
	:of	:Pine	:Acres:	:	:State:	:	:	:	:	:	:	:
County	:Jobs:	:Prot.:	:Worked:	:Wild:	:Cult.:	:Labor:	:State:	:Federal:	:Total:	:Costs	:	:Ribes
Crawford:	1:	-	: 30	: 450:	0	: 4.00:	0	: 4.66	: 8.66:	0.29	:	15.
Gr. Traverse:	1:	200	: 360	: 54:	0	: 0	: 2.29	: 0	: 2.29:	0.06	:	0.2
Washtenaw:	1:	3	: 30	: 7500:	0	: 38.40:	0	: 0	: 38.40:	1.28	:	250.
Totals	:	3:	203	: 420	: 8004:	0	: 42.40:	2.29	: 4.66	: 49.35:	0.12	: 19.

Much of the Ribes eradication work in upper Michigan was performed in stands already quite heavily infected with blister rust. A considerable amount of canker pruning was performed on stands already protected bordering highways. All infected branches found were pruned off. The purpose of this pruning was two-fold; first, to save the trees already infected, and second, to remove unsightly dead branches from stands supposedly protected against blister rust, thus assuring the public that every effort was being made to remove existing infection as well as guarding against its future occurrence. In Table No. 11 the amount of this work in upper Michigan in 1932 is shown. Attention is directed to the fact that this work cost approximately 10¢ per acre and 4¢ per canker.

A decided difference in the type of eradication work performed in upper and lower Michigan is evident. The average number of acres worked in upper Michigan per job was approximately 438 acres, while in the lower peninsula it was approximately 187 acres.

To protect one acre of pine in upper Michigan, it was necessary to work approximately 3.8 acres, while in lower Michigan it required 3.4 acres, indicating that the pine stands in lower Michigan were smaller and more widely separated, thus requiring a higher proportion of protecting strip than in upper Michigan.

In upper Michigan an average of 121 Ribes per acre was found as contrasted to an average of 36 in lower Michigan -- nearly 3½ times as many. This greater abundance of Ribes in upper Michigan is directly reflected in Ribes eradication costs. In lower Michigan the average cost per acre was \$254 as opposed to \$54 in upper Michigan or 2.6 times as much in upper Michigan.

No second eradication work was done in the Upper Peninsula. That performed in lower Michigan is shown in Table No. 10.

Table No. 10

Cooperative Local Control, 2nd eradication,
Michigan-1932.
Lower Michigan. All on state land.

County	Jobs: Protected	Wild: Cult.	Labor: State	Federal: Total	Costs: Ribes
Grayford	1: 30	0: 450	0: 4.00	0: 4.68	8.66: 0.28
Gettysburg	1: 200	0: 380	0: 54	0: 2.28	2.28: 0.06
Washington	1: 30	0: 7500	0: 38.40	0: 0	38.40: 1.28
Totals	3: 203	0: 8004	0: 42.40: 2.28	4.68	42.36: 0.18
					Per Acre

Much of the Ribes eradication work in upper Michigan was performed in stands already quite heavily infected with blister rust. A considerable amount of canker pruning was performed on stands already protected bordering highways. All infected branches found were pruned off. The purpose of this pruning was two-fold; first, to save the trees already infected, and second, to remove unsightly dead branches from stands supposedly protected against blister rust, thus assuring the public that every effort was being made to remove existing infection as well as guarding against its future occurrence. In Table No. 11 the amount of this work in upper Michigan in 1932 is shown. Attention is directed to the fact that this work cost approximately 10¢ per acre and 4¢ per canker.

Table No. 11

Removal of Cankers from Protected Pine Areas.
Marquette County, Michigan 1932.

Name of Area	: Acres	: Est. No. : :Cankers	: Individual: :Worked:Destroyed:	: State : : Cost	: Federal : : Cost	: Total : Cost
C.C.I. Pinery	: 40	: 193	: \$ 4.32	: \$ 1.07	: \$ 2.33	: \$ 7.72
Palmer Area	: 180	: 410	: 9.60	: 2.14	: 4.66	: 16.40
Junction Area	: 80	: 148	: 2.88	: .70	: 2.33	: 5.91
North Lake Area	: 160	: 518	: 7.52	: 3.91	: 9.32	: 20.75
West Ishpeming	: 100	: 953	: 19.20	: 4.94	: 13.98	: 38.12
Blueberry Mine	: 700	: 914	: 18.40	: 4.20	: 13.98	: 36.58
Total	: 1260	: 3136	: 61.92	: 16.96	: 46.60	: 125.48

USE OF RELIEF LABOR ON BLISTER RUST CONTROL PROJECTS.

Because blister rust control is a type of work that can be done by nearly any able-bodied man and because practically all money spent on local control goes toward the employment of men rather than purchase of equipment, Ribes eradication is very well thought of as a means of furnishing work relief to the unemployed. That blister rust control was used to a considerable extent in furnishing a means of relieving unemployment is evidenced in Table No. 12.

Table No. 12

Use of Relief Labor on Blister Rust Control Projects, Michigan 1932.

County	: Name of : : Project	: Acres: : Worked:	: No. Men : : Employed:	: No. : : Days:	: Payment : : By : Whom:	: How : : Paid	: Rate : : Day	: Total : : Payment:	: Quality of Work : : Remarks
Upper Michigan:									: Poor to Fair. Men
Delta	: City of					: Food			: working to pay for
	: Escanaba	: 1750	: 20	: 391	: City: Orders	: 2.40	: 938.40	: 938.40	: past relief. Not
									: satisfactory.
Marquette	: 5 areas	: 1775	: 71	: 542	: City: Cash	: 2.56	: 1387.52	: 1387.52	: Good. Cash paymt
	: in co.								: keeps up morale
									: of men.
Lower Michigan:									
Grand Traverse:	: City Park	: 500	: 4	: 28	: City: Credit	: 2.40	: 67.20	: 67.20	: Good.
Mason	: Ludington:								
	: City Park:	: 250	: 2	: 11	: City: Cash	: 2.40	: 26.40	: 26.40	: Good.
Midland	: City Park:	: 434	: 8	: 45	: City: Cash	: 2.40	: 108.00	: 108.00	: Good after second
									: working.
Montcalm	: Greenville:								
	: City Park:	: 340	: 3	: 17	: City: Cash	: 2.40	: 40.80	: 40.80	: Fair
Ottawa	: Owen Park	: 403	: 10	: 36	: City: Scrip	: 3.20	: 115.20	: 115.20	: Good
Totals		: 5452	: 118	: 1070				: 2683.52	

Table No. 11

Removal of Cankers from Protected Pine Areas.
Marquette County, Michigan 1932.

Total	1260	3136	61.32	16.96	46.60	122.48
Blueberry Mine	700	914	18.40	4.20	13.98	36.58
West Ishpeming	100	252	19.20	4.94	13.98	38.12
North Lake Area	160	218	7.22	3.91	9.32	20.75
Junction Area	80	148	2.88	.70	2.33	2.91
Palmer Area	180	410	9.60	2.14	4.66	16.40
C.G.I. Pinery	40	125	4.32	\$ 1.07	2.33	7.72
Worked: Destroyed			Cost	Cost	Cost	Total
Acres: Cankers			Individual	State	Federal	
Est. No.						

USE OF RELIEF LABOR ON BLISTER RUST CONTROL PROJECTS.

Because blister rust control is a type of work that can be done by nearly any able-bodied man and because practically all money spent on local control goes toward the employment of men rather than purchase of equipment, Ribes eradication is very well thought of as a means of furnishing work relief to the unemployed. That blister rust control was used to a considerable extent in furnishing a means of relieving unemployment is evidenced in Table No. 12.

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Use of Relief Labor on Blister Rust Control Projects, Michigan 1932.

County	Project	Worked: Employed	Days: From	Paid: Day	Payment	No. :	Quality of Work
Name of :	Acres: No. Men :	By :	How :	Rate: Total :	Remarks		
Delta	City of :	Food :			Working to pay for		
Isabella	1750 :	20 :	301:City:Orders:2.40 :	238.40:	past relief. Not		
Marquette	5 areas :	1775 :	42:City:Cash :	2.56:1387.52:	Good. Cash paymt		
Marquette	in co. :				keeps up morale		
Marquette					of men.		
Marquette	City Park :	500 :	28:City:Credit:2.40 :	67.20:	Good.		
Marquette	City Park :	350 :	11:City:Cash :	2.40:	26.40:Good.		
Marquette	City Park :	434 :	42:City:Cash :	2.40:	108.00:Good after second		
Marquette	City Park :	340 :	17:City:Cash :	2.40:	40.80:Fair		
Marquette	City Park :	402 :	36:City:Scip :	3.20:	115.20:Good		
Totals	5452 :	118 :	1070 :		2685.22 :		

In Marquette County the stagger system of employment was used. Two crews of 5 men each were given employment for the full 8 hours per day on Monday and Tuesday. Two other crews were used on Wednesday and Thursday and a third group of 2 crews was used Friday and Saturday. The first group of two crews came to work on the following Monday and Tuesday, etc. The men were paid in cash at a rate of \$2.56 per 8-hour day. This gave each man over \$5 per week to live on.

The Marquette County officials accepted the principle that a young pine stand is a valuable county asset and as such is worth protecting against blister rust regardless of ownership. The county work in Marquette County therefore was not confined to county-owned land.

In the City of Escanaba blister rust control work was given to those men who had been dependent upon the city for relief for the longest while. Their compensation consisted of back credit for relief already afforded them. This method of giving relief produced unsatisfactory results. The men showed a disinclination to work and their efficiency in finding Ribes was very low.

In the Lower Peninsula all work on control done by the unemployed was performed in city parks by men furnished by the cities concerned. Payment for this work was either as credit for future necessities or as cash and was quite uniformly successful.

SUMMARY OF RIBES ERADICATION WORK.

In Table No. 13 there is shown the record by years of all Ribes eradication work done in Michigan from 1928 to 1932 inclusive.

Table No. 13

Summary by Years of Ribes Eradication Work. Michigan 1928-1932 Incl.

Year:	:Acres Worked			:Ribes Pulled :		Total	: Per Acre :		
	:Initial:	:2nd :	:Erad:	:Wild :	:Cult.:		:Cost :	:Ribes :	:Cost Per Bush
1928:	1500	:	0	:	1500:	82788:	263:	\$ 739.32	: .493 : 55.2 : .89
1929 :	2530	:	40	:	2570:	170982:	391:	3607.63	: 1.404 : 66.5 : 2.11
1930:	6518	:	60	:	6578:	373016:	440:	5161.94	: .785 : 56.7 : 1.38
1931:	12252	:	0	:	12252:	505310:	687:	4359.52	: .356 : 41.2 : .86
*1932:	16871	:	420	:	17291:	1171711:	438:	7038.79	: .407 : 67.8 : .60
Totals:	39671	:	520	:	40191:	203807:	2219:	20907.20	: .522 : 57.4 : .91

*Includes an item of \$125.48, the cost of removing 3136 cankers from pines on 1260 acres in Upper Michigan.

It is interesting to note that although the average number of Ribes per acre was the highest in 1932, the cost per acre was next to the lowest.

While the cost per bush pulled may not be a true expression of the cost of the eradication job since it does not measure such factors as the average

In Marquette County the stagger system of employment was used. Two crews of 5 men each were given employment for the full 8 hours per day on Monday and Friday. Two other crews were used on Wednesday and Thursday and a third group of 3 crews was used Friday and Saturday. The first group of two crews came to work on the following Monday and Friday, etc. The men were paid in cash at a rate of \$2.56 per 8-hour day. This gave each man over \$5 per week to live on.

The Marquette County officials accepted the principle that a young pine stand is a valuable county asset and as such is worth protecting against blight not regardless of ownership. The county work in Marquette County therefore was not confined to county-owned land.

In the City of Escanaba blight was control work was given to those men who had been dependent upon the city for relief for the longest while. Their compensation consisted of back credit for relief already afforded them. This method of giving relief produced unsatisfactory results. The men showed a disinclination to work and their efficiency in finding Ribes was very low.

In the Lower Peninsula all work on control done by the unemployed was performed in city parks by men furnished by the cities concerned. Payment for this work was either as credit for future necessities or as cash and was quite uniformly successful.

SUMMARY OF RIBES ERADICATION WORK.

In Table No. 13 there is shown the record by years of all Ribes eradication work done in Michigan from 1928 to 1932 inclusive.

Table No. 13

Summary by Years of Ribes Eradication Work, Michigan 1928-1932 Incl.

Year	Initial	Final	Total	Cost	Cost Per Acre	Cost Per Bush
1928	1500	0	1500	82738	55.2	89
1929	2530	40	2570	170982	66.5	2.11
1930	6218	60	6278	375016	59.7	1.38
1931	12252	0	12252	503310	41.2	88
1932	16871	420	17291	7038.79	40.7	60
Total	39871	520	40391	20907.30	52.2	91

Inclusive in item of \$125.48, the cost of removing 5136 cankers from pines on 1280 acres in Upper Michigan.

It is interesting to note that although the average number of Ribes per acre was the highest in 1932, the cost per acre was next to the lowest.

While the cost per bush pulled may not be a true expression of the cost of the eradication of Ribes since it does not measure such factors as the average

size of bush, the searching time, difficulty of covering ground, etc., nevertheless it may be used to compare the work done in different years. In Table No. 13 it may be noticed that the average cost per bush was by far the highest in 1929 and 1930. With the exception of these two years the cost per bush has come down consistently from 1928 to 1932. The lower cost in 1931, and particularly in 1932, is undoubtedly chargeable to a large extent to the use of relief labor and to the general low wage scale paid in these two years, particularly in 1932.

The status of control in Michigan at the end of 1932 is seen in Table No. 14. It is evident that only a very small per cent of the white pine in Michigan has been furnished protection against blister rust.

Table No. 14.

Status of Local Control in Michigan at End of 1932.

Acres good native white pine	274,584
Acres white pine planted on State lands	34,630
Acres scattered native white pine	718,232
Total acres white pine	1,027,446
Acres white pine initially protected (1918-1932)	12,613
Per cent total acres white pine initially protected	1.2%
Per cent acres "good" white pine initially protected	4.8%

NURSERY SANITATION.

In Table No. 15 the status of nursery sanitation is shown:

(See next page)

For the most part the nurseries in Michigan are not producing white pine for export purposes. However, since Michigan as a state is active in its reforestation work and one which raises white pine for reforestation purposes quite extensively, nursery sanitation plays an important part in the control program. For the most part the state and Federal nurseries have agreed to the desirability of going over their nurseries and sanitation zones yearly in the spring for Ribes. They have been willing cooperators in this matter.

CULTIVATED BLACK CURRANT ERADICATION.

In Table No. 16 is shown a statement of all cultivated black currant eradication performed in Michigan since the inception of such work in 1929.

size of bush, the searching time, difficulty of covering ground, etc., nevertheless it may be used to compare the work done in different years. In Table No. 13 it may be noticed that the average cost per bush was by far the highest in 1929 and 1930. With the exception of these two years the cost per bush has come down consistently from 1928 to 1932. The lower cost in 1931, and particularly in 1932, is undoubtedly chargeable to a large extent to the use of relief labor and to the general low wage scale paid in these two years, particularly in 1932.

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Acres white pine planted on State lands	34,630
Acres scattered native white pine	718,332
Total acres white pine	1,027,446
Acres white pine initially protected (1918-1932)	12,613
Per cent total acres white pine initially protected	1.2%
Per cent acres "good" white pine initially protected	4.8%

NURSERY SANITATION.

In Table No. 15 the status of nursery sanitation is shown:

(See next page)

For the most part the nurseries in Michigan are not producing white pine for export purposes. However, since Michigan as a state is active in its reforestation work and one which raises white pine for reforestation purposes and extensively, nursery sanitation plays an important part in the control program. For the most part the state and Federal nurseries have agreed to the desirability of going over their nurseries and sanitation zones yearly in the spring for fires. They have been willing co-operators in this matter.

CULTIVATED BLACK CURRANT ERADICATION.

In Table No. 16 is shown a statement of all cultivated black currant eradication performed in Michigan since the inception of such work in 1929.

List of Principal White Pine Producing Nurseries and Status of Nursery Sanitation. Michigan 1932.

[illegible]

[illegible]

Table No. 16

Cultivated Black Currant Eradication. Michigan 1929-1932.

County	1929		1930		1931		1932		Total	
	Loc.:	Comp- : Bushes: leted:	Loc.:	Comp- : Bushes: leted:	Loc.:	Comp- : Bushes: leted:	Loc.:	Comp- : Bushes: leted:	Loc.:	Comp- : Bushes: leted:
Antrim	5	25 : No							5	25: No
Baraga					203	1075 : Yes:			203	1075: Yes
Benzie							48	712: Yes	48	712: Yes
Berrien	1	75 : No							1	75: No
Charlevoix							43	594: Yes	43	594: Yes
Cheboygan			190	1354 : Yes					190	1354: Yes
Delta							72	526: No	72	526: No
Dickinson									223	1043: Yes
Gogebic									537	6140: Yes
Grand Traverse	1	3 : No							101	1022: Yes
Iosco									17	58: Yes
Iron					76	1299 : Yes			76	1299: Yes
Leelanau	1	45 : No							1	45: No
Manistee	1	1 : No							1	1: No
Marquette										
Mason									879	11091: Yes
Menominee										
Midland									50	913: Yes
Misaukee										
Montcalm									67	378: Yes
Muskegon										
Newaygo	1	1 : No							57	433: Yes
Ocean										
Roscommon									50	913: Yes
									67	378: Yes
									57	433: Yes
									50	206: Yes
									79	484: Yes
									89	1174: Yes
									52	182: Yes
									110	2855: Yes
									14	263: Yes
	10	150	384	2488	478	6403	270	3178	2965	31948

In Michigan the entire control program is hinged upon the principle that cultivated black currants are a nuisance and must be destroyed in order that white pine stands protected by the removal of all currants and gooseberries within 900 feet may be thoroughly protected. Thus in Michigan local control efforts are concentrated in those counties from which cultivated black currants have been removed.

The method of performing black currant eradication in Michigan is as follows: The men work singly or in pairs with a truck. Each road is covered and every house is visited. All black currants are inspected for blister rust as they are pulled. All pine stands are located on county map and where possible the owners are interviewed relative to the protection of such stands. Thus when a county is completed not only are the black currants removed but the region has been scouted for blister rust, pine stands have been located, and in some instances future cooperative jobs have been lined up and the people in general have been informed as to blister rust control. During the period 1929 to 1932, 2,965 locations containing 31,948 cultivated black currants have been found and destroyed in 24 counties of Michigan.

In Table No. 17 there are shown the costs of cultivated black currant eradication work to date.

Table No. 17.

Costs of Cultivated Black Currant Eradication Work, Michigan
1929 to 1932.

Year	:No. Counties:		Black Currants Pulled:			Costs		
	:Worked or	:	:	:	:	:	:	:
	: Completed	:	: Locations	: Bushes	: Federal	: State	: Total	:
Coop. Control	0	:	10	:	150:	(Included under Cooperative Control)		
1929	: 5	:	384	:	2488: 451.77	: 6000.87	: 6452.64	
1930	: 6	:	1823	:	19729: 0	: 11476.97	: 11476.97	
1931	: 4	:	478	:	6403: 1348.41	: 1566.31	: 2914.72	
1932	: 5	:	270	:	3178: 769.70	: *2359.41	: * 3129.11	
Totals	: 20	:	2965	:	31948: 2569.88	: 21403.56	: 23973.44	

INVESTIGATIONAL ACTIVITIES.

Very little investigational work was performed in Michigan in 1932. In Upper Michigan a new demonstration area near Negaunee in Marquette County named the "Teal Lake Area" has been established. This plot, 1 acre in size, contains white pine ranging from seedlings to trees 10" in diameter. Infection on this plot was caused chiefly by a large plot of cultivated black currants about 1/4 mile away. These black currants were destroyed in 1930. A preliminary survey of this plot showed that about 75% of the trees are infected and many are already dead. The plot is surrounded with a barbed wire fence to keep out cattle which otherwise rub against the infected trees causing them to break over.

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In Table No. 17 there are shown the costs of cultivated black currant eradication work to date.

Table No. 17.

Costs of Cultivated Black Currant Eradication Work, Michigan
1922 to 1932.

Year	Completed	Locations	Bushes	Federal	State	Total	Costs	No. Counties: Black Currants Pulled
1922	5	270	3173	769.70	*2359.41	*3139.11		
1931	4	478	6403	1248.41	1566.31	2814.72		
1930	6	1823	19729	0	11476.97	11476.97		
1929	5	384	2488	451.77	8000.87	8452.64		
1932	0	10	150	(Included under Cooperative Control)				
Totals	20	2965	31948	2569.88	21403.56	23973.44		

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The "Stolen Infection Plot" near West Ishpeming was visited by many people in 1932. Infection here also was caused by cultivated black currants approximately 100 yards from the plot destroyed in 1930. Cattle have destroyed many of the infected trees on this area.

The "Ralph Area" in Dickinson County was left undisturbed this year. Infection here is largely chargeable to native wild Ribes. A large percentage of the young growth as well as middle aged trees are infected with blister rust and much damage is already apparent. It is expected that this plot will be used as an area to study the relative susceptibility of pine species. Plans are being made to plant Pinus peuce, P. strobus and P. monticola in alternate rows and study the effect of the rust on them.

INFORMATIONAL WORK.

Upper Peninsula.

Shortly before the beginning of the field season a radio talk on blister rust was given from a station in Marquette and a full account of the talk given in the Marquette paper.

Early in May several blister rust talks were given at schoolshaving school forests. Each child was given a blister rust pamphlet.

Window displays consisting of an illustrated panel, diseased trees, cankers, infected leaves and Riker Mounts were placed in the larger towns. Window space is gladly contributed by county agricultural agents, real estate firms, post offices and banks. The window display is undoubtedly one of the most effective means of advertising blister rust we have and one of the most economical.

Two blister rust exhibits were given at fairs, one at the Upper Peninsula State Fair at Escanaba and the other at the Marquette County Fair. As a result of the exhibit at Escanaba about two-thirds of the black currant owners had already destroyed their bushes when approached on the matter by the black currant eradicator.

Lower Peninsula.

Newspaper publicity on blister rust control was especially valuable in those counties in which the cultivated black currant eradication work is being done. About twenty articles were published in newspapers in the Lower Peninsula. Window displays were placed in all towns where activities were carried on. Boy Scouts, Y.M.C.A. camps were visited and talks given. Fair attendance was limited to some extent and the exhibit was placed only at the Detroit State Fair.

COSTS.

In Table No. 18 there is shown a summary of all State and Federal expenditures for blister rust control projects in Michigan during the calendar year 1932. Under State expenditures are included all actual

The "Stolen Infestation Plot" near East Lansing was visited by many people in 1932. Infestation here also was caused by cultivated black currants approximately 100 yards from the plot destroyed in 1930. Cattle have destroyed many of the infected trees on this area.

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expenditures or contributed time of the various State agencies, all wages of laborers on Ribes eradication work and the value of the owner's labor at the going rate of pay. In other words, under State costs are included all expenditures not furnished by the Federal Government.

Table No. 18.

State and Federal Expenditures for all Blister Rust Control Projects.
Michigan. Jan. 1 to Dec. 31, 1932.

Agency	Class.	vi-	Agent	Eradica	Currant	Data	Sanita-	Compen		
:	:	sion	Act.	tion	Erad.	:	tion	sation	Misc.	Total
State	:Salaries	:	:168.94	:4729.79	:933.06	:8.37	:38.40	:	:	:5878.56
	:Expenses	:350.00	:451.60	:641.74	:1416.35	:4.45	:	:10.00	:64.81	:2938.95
	:Sub-Total	:350.00	:620.54	:5371.53	:2349.41	:12.82	:38.40	:10.00	:64.81	:8817.51
Federal	:Salaries	:	:2601.92	:939.13	:435.34	:7.99	:18.66	:	:	:4003.04
	:Expenses	:	:1681.05	:728.13	:334.36	:7.68	:17.23	:	:83.18	:3606.63
	:Sub-Total	:	:4282.97	:1667.26	:769.70	:15.67	:35.89	:	:83.18	:7609.67
	:Grand Total	:350.00	:4903.51	:7038.79	:3119.11	:28.49	:74.29	:10.00	:902.99	:16427.18

In Table No. 19 the material in Table No. 18 is expressed as a per cent of each project expenditure spent by each agency. It may be observed that the total cost of supervision was borne by the State. The State bore approximately 3/4 of the cost of Ribes eradication and black currant eradication. The State also bore approximately half the cost of field data and nursery sanitation.

The Federal Government furnished 87% of blister rust control agent activities and practically 93% of miscellaneous items. These miscellaneous items included the purchase of two Ford Coaches 1932 models.

In Table No. 20 the total cost of blister rust control in Michigan is shown as a per cent of total expenditures of each agency spent on each project.

Table No. 19.

Per Cent of Total of Each Project Expenditure Spent by
each agency. Michigan 1932.

Agency	Super-	B.R.C.	Ribes	Black	Field	Nursery	Ribes			
:	vision	Agent	Erad.	Currant	Data	Sanita-	Compen-	Misc.	:	Total
:	:Acct.	:	:Erad.	:	:tion	sation	:	:	:	:
State	:100.0	:12.7	:76.3	:75.3	:45.0	:51.7	:100.0	:7.2	:	:53.7
Federal	: -	:87.3	:23.7	:24.7	:55.0	:48.3	: -	:92.8	:	:46.3
Total	:100.0	:100.0	:100.0	:100.0	:100.0	:100.0	:100.0	:100.0	:	:100.0

expenditures or contributed time of the various State agencies, all wages of laborers on fiber eradication work and the value of the owner's labor at the going rate of pay. In other words, under State costs are included all expenditures not furnished by the Federal Government.

Table No. 18.

State and Federal Expenditures for all Blister Rust Control Projects.
Michigan, Jan. 1 to Dec. 31, 1932.

Agency	Class	Agent	Field	Nursery	Fiber	Total
State	Salaries	158.94	4728.79	933.08	8.87	38.40
Expenditures	350.00	451.60	641.74	1415.35	4.45	10.00
Sub-Total	350.00	630.54	5871.53	2549.41	13.85	38.40
Federal	Salaries	3801.92	939.15	455.54	7.99	18.68
Expenditures	1081.02	738.13	354.36	7.68	17.28	18.68
Sub-Total	4882.97	1667.28	799.70	15.67	35.96	37.36
Grand Total	350.00	4002.51	7038.79	3119.11	28.49	74.29
						10.00
						903.99
						18427.18

In Table No. 19 the material in Table No. 18 is expressed as a per cent of each project expenditure spent by each agency. It may be observed that the total cost of supervision was borne by the State. The State bore approximately 3/4 of the cost of fiber eradication and black current eradication. The State also bore approximately half the cost of field data and nursery sanitation.

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Per Cent of Total of Each Project Expenditure Spent by each agency. Michigan 1932.

Agency	Class	Agent	Field	Nursery	Fiber	Total
State	100.0	12.7	75.3	45.0	51.7	100.0
Federal	-	87.3	24.7	55.0	48.5	-
Total	100.0	100.0	100.0	100.0	100.0	100.0

Table No. 20

Per Cent of Total Expenditures of Each Agency Spent on
Each Project. Michigan 1932.

	Super- vision	B.R.C. Agent	Ribes Eradica- tion	B.C. Erad.	Field Data	Nursery Sanita- tion	Ribes Compensa- tion	Misc.	Total
State	4.0	7.0	60.9	26.7	0.2	0.4	0.1	0.7	100.0
Federal	0.0	56.3	21.9	10.1	0.2	0.5		11.0	100.0
Total	2.1	29.8	42.8	19.0	0.2	0.5	0.1	5.5	100.0

Nearly 88% of the State expenditures were spent on Ribes eradication and black currant eradication. The major portion of the Federal expense was spent on the two projects blister rust control agent activities and Ribes eradication, these two projects accounting for approximately 78% of the total Federal expenditures.

In the total cost of blister rust control only approximately 2% was spent for supervision. Nearly 91% of the cost was spent on the three projects, blister rust control agent activities, Ribes eradication and black currant eradication.

SUMMARY AND CONCLUSION.

The guiding principle in the control program in Michigan is that cultivated black currant eradication and wild Ribes eradication must go hand in hand. During 1932, 16,871 acres were cleared of Ribes to protect the white pine on 5,364 acres. This cost an average of 41¢ per acre to pull Ribes at the rate of 69 per acre. The acreage cleared of Ribes in 1932 constitutes over 40% of the total acreage worked since 1928 when eradication work first started.

It is estimated that we have to date initially protected 4.8% of the total estimated white pine in Michigan classified as "good" or 1.2% of the total million acres of white pine. We have barely made a start in our blister rust control program.

The relatively large area cleared of Ribes in 1932 is chargeable principally to the use of relief labor on control projects. Blister rust constitutes an excellent work relief project because the work is not difficult for the average man to comprehend and because practically 100% of the expenditure goes for labor and not for equipment.

A great deal has been accomplished in cultivated black currant eradication. During the period 1929 to 1932 inclusive, 2,965 locations containing 31,948 cultivated black currants have been found and destroyed in 24 counties in Michigan. White pine is used extensively in Michigan's vigorous reforestation policy hence it is highly important that white pine planting stock be grown under rust-free conditions. Nursery sanitation has been performed around all of the principal nurseries, either State

In the total cost of blaster rust control only approximately \$5 was spent for supervision. Nearly 91% of the cost was spent on the three projects, blaster rust control agent activities, Ribes eradication and black current eradication.

The guiding principle in the control program in Michigan is that cultivated black currant eradication and wild Ribes eradication must go hand in hand. During 1932, 16,371 acres were cleared of Ribes to protect the white pine on 2,364 acres. This cost an average of 41¢ per acre to pull Ribes at the rate of 60 per acre. The acreage cleared of Ribes in 1932 constitutes over 40% of the total acreage worked since 1923 when eradication work first started.

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or Federal, growing white pine for reforestation purposes. The policy has been established of checking each nursery and its sanitation zone yearly for Ribes.

Blister rust is known to be present in 45 of the white pine growing counties of Michigan. It has reached the damage stage in Marquette and Dickinson Counties in Upper Michigan. The rust is now so widespread that it is no exaggeration to state that no young white pine stand can survive to commercial maturity if Ribes within infecting distances are allowed to remain. A blister rust program well organized and carried out can insure the continued production of white pine in Michigan.

The Michigan Department of Conservation has been working for several years to control the Ribes problem. In 1937 a Ribes survey was made of the entire State. This survey was made by the Michigan Department of Conservation, and the results were given to the individual landowners.

From 1937 to 1940 the Ribes work in Michigan was organized as a Ribes control project. This project was organized by the Michigan Department of Conservation, and the results were given to the individual landowners. In 1940 a Ribes control project was organized and a Ribes control project was organized in 1941. The results of this project were given to the individual landowners.

The Ribes control project was organized in 1941. This project was organized by the Michigan Department of Conservation, and the results were given to the individual landowners. In 1942 a Ribes control project was organized and a Ribes control project was organized in 1943. The results of this project were given to the individual landowners.

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The Ribes control project was organized in 1950. This project was organized by the Michigan Department of Conservation, and the results were given to the individual landowners. In 1951 a Ribes control project was organized and a Ribes control project was organized in 1952. The results of this project were given to the individual landowners.

The Ribes control project was organized in 1953. This project was organized by the Michigan Department of Conservation, and the results were given to the individual landowners. In 1954 a Ribes control project was organized and a Ribes control project was organized in 1955. The results of this project were given to the individual landowners.

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Hiber rust is known to be present in 45 of the white pine growing counties of Michigan. It has reached the damage stage in Marquette and Jackson Counties in Upper Michigan. The rust is now so widespread that it is no exaggeration to state that no young white pine stand can survive to commercial maturity if Hiber within infecting distances are allowed to remain. A Hiber rust program well organized and carried out can insure the continued production of white pine in Michigan.

BLISTER RUST CONTROL, WISCONSIN

1932

HISTORY OF WORK.

White pine blister rust control work started in 1918 when a state appropriation of \$7,500 annually was made available. This amount was appropriated during the fiscal years 1919 and 1920. In the fiscal year 1921 the amount was reduced to \$4,000 annually and this amount was appropriated each year to and including the fiscal year 1923. Since 1923 no state appropriations have been made for blister rust control. However, a limited amount of control work has been performed since 1923 through funds derived from other state sources, principally the Department of Agriculture and Markets and the Department of Conservation, and from assistance given by a few individual cooperators.

From 1918 to 1929 the control work in Wisconsin was supervised by a permanent agent. However, during the past few years he has been used chiefly on special assignments such as transit inspection, experiment work at the Eau Galle demonstration area, scouting for the rust, etc. In 1930 a definite control program was adopted and a permanent state leader was appointed to take charge of all blister rust control activities in the state.

The control work prior to 1924 consisted of local eradication of Ribes to protect pine areas and the destruction of infected pines to prevent the spread of the rust. Except for a small amount of individual cooperation all this work was performed by state men.

No control work was done during the years 1924 and 1925.

From 1926 to 1930 inclusive only a small amount of Ribes eradication was done annually. This work was confined for the most part to heavily infected areas where the number of Ribes per acre and the costs per acre were both high.

During 1931 nearly 4,000 acres were cleared of Ribes on cooperative control projects. The cost of labor on these projects was furnished by the pine owners, either Federal, state or private.

During 1932 over 18,000 acres were initially cleared of Ribes on cooperative control projects. Blister rust control as a work relief project was made considerable use of by city and county authorities in Wisconsin in 1932.

ORGANIZATION.

Blister rust control in Wisconsin is organized under a cooperative arrangement between the Wisconsin Department of Agriculture and Markets, the Wisconsin Conservation Department and the U. S. Department of Agriculture through its Division of Blister Rust Control.

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All blister rust control work is supervised by a permanent state leader whose salary and expenses are borne by the U. S. Department of Agriculture. The state leader works under the administrative direction of the state entomologist in charge of the Division of Insect and Plant Disease Control, State Department of Agriculture and Markets.

The Wisconsin Department of Agriculture and Markets, through its Division of Insect and Plant Disease Control, in addition to assuming administrative direction of the work also furnishes financial aid for state laws and regulations necessary for effective control.

The Wisconsin Conservation Department cooperates by making its organization and personnel available in general control work and by allotting funds for Ribes eradication work on lands under its direct supervision.

The U. S. Department of Agriculture, through its Division of Blister Rust Control, furnishes blister rust control leadership and supervision for informational and service work in the state. It provides subject matter and technical information essential to the proper conduct of the work. It directs experiments and demonstration necessary for the improvement of control practices. The state leader under general direction of the State Entomologist supervises all blister rust control in the state. He is responsible for working up a control program and seeing to it that it is carried out. His duties are to secure local cooperation, direct the state foremen, maintain accurate field and office records, and prepare a report summarizing the results obtained in cooperative blister rust control work.

STATUS OF THE RUST.

White pine blister rust is known to be well distributed throughout the white pine-growing area of Wisconsin. Up to the end of 1932 rust either on pines or Ribes or both had been found in a total of 33 counties, in 17 of which infection had been found on both pines and Ribes. The list of infected counties showing the year when infection was first found is contained in Table No. 21 which follows:

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The U. S. Department of Agriculture, through its Division of Blister Rust Control, furnishes Blister rust control leadership and supervision for informational and service work in the state. It provides subject matter and technical information essential to the proper conduct of the work. It directs experiments and demonstration necessary for the improvement of control practices. The state leader under general direction of the state entomologist supervises all blister rust control in the state. He is responsible for working up a control program and seeing to it that it is carried out. His duties are to secure local cooperation, direct the state foreman, maintain accurate field and office records, and prepare a report summarizing the results obtained in cooperative blister rust control work.

STATUS OF THE RUST.

White pine blister rust is known to be well distributed throughout the white pine-growing area of Wisconsin. Up to the end of 1933 rust either on pines or Ribes or both had been found in a total of 33 counties, in 17 of which infection had been found on both pines and Ribes. The list of infected counties showing the year when infection was first found is contained in Table No. 21 which follows:

Table No. 21

Infected Counties in Wisconsin Classified According to Year
Infection First Found, 1932.

:Year :	:	:	:	:	:	:	:
:Ribes :	:	:	:	:	:	:	:
:Infec-:Ribes :	:	:	:	:	:	:	:
:tion :Infec- :	:	Year Pine Infection First Found					:
:First :tion :	:	:	:	:	:	: Total :	:
:Found :Only :	:	:1915 to 1927 Inc.:	:1930 :	:1931 :	:1932 :	: Number :	:
:	:	:Barron :	:	:	:	:	:
:	:	:Burnett :	:	:	:	:	:
:1915- :	:	:Dunn :	:	:	:	:	:
:1927 :	:	:Polk :	:	:	:	:	:
:	:Marathon :	:Sawyer :	:	:Chippewa:	:	:	:
:	:Rusk :	:Shawano :	:	:Pepin :	:	:	:
:	:Washburn :	:St. Croix :	:Clark :	:Pierce :	:	: 14 :	:
:1928 :	:	:	:	:Waupaca :	:	: 1 :	:
:	:Florence :	:	:	:	:	:	:
:1929 :	:Forest :	:	:	:	:	: 2 :	:
:1930 :	:Eau Claire:	:	:Douglas:	:	:	: 2 :	:
:	:Dane :	:	:	:	:	:	:
:1931 :	:Jackson :	:	:	:Oconto :	:	: 3 :	:
:	:Ashland :	:	:	:	:	:	:
:	:Brown :	:	:	:	:	:	:
:	:Door :	:	:	:	:	:	:
:1932 :	:Grant :	:	:	:	:	:	:
:	:Kewaunee :	:	:	:	:	:	:
:	:LaCrosse :	:	:	:	:Portage :	:	:
:	:Lincoln :	:	:	:	:Vernon :	:	:
:	:Marinette :	:	:	:	:Wood :	: 11 :	:
:Totals:	: 16 :	: 7 :	: 2 :	: 5 :	: 3 :	: 33 :	:

Blister rust was first discovered in Polk County on pine in 1915 and reported to Plant Pathology Department at University of Minnesota in 1916. Pine infection is well established and has reached the damage stage at various points in northwestern Wisconsin in the counties of Polk, St. Croix, Barron, Dunn and Chippewa and in the eastern portion of Waupaca and Shawano Counties. Efforts were made, particularly in the years 1918 to 1923, to reduce the spread of the rust by the destruction of infected trees. However, these efforts were unsuccessful and the rust has such a firm foothold in the white pine-growing areas of Wisconsin that it is hopeless to expect that a young white pine stand will survive to commercial maturity if Ribes within infecting distances are allowed to remain.

Although no special funds were devoted to scouting for blister rust in Wisconsin during 1932, nevertheless we have new infections both on pines and Ribes here found in connection with other work. A list of these infections follows:

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Although no special funds were devoted to scouting for blister rust

within infecting distances are allowed to remain. that a young white pine stand will survive to commercial maturity if Ribes the white pine-growing areas of Wisconsin that it is hopeless to expect these efforts were unsuccessful and the rust has such a firm foothold in reduce the spread of the rust by the destruction of infected trees. However, Counties. Efforts were made, particularly in the years 1918 to 1923, to various points in northwestern Wisconsin in the counties of Polk, St. Croix, Barron, Dunn and Chippewa and in the eastern portion of Waupaca and Shawano reported to Plant Pathology Department at University of Minnesota in 1916. Blister rust was first discovered in Polk County on pine in 1915 and

Year :	1915 :	1916 :	1917 :	1918 :	1919 :	1920 :	1921 :	1922 :	1923 :	1924 :	1925 :	1926 :	1927 :	1928 :	1929 :	1930 :	1931 :	1932 :	1933 :	Total :
Year First Found :	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934
Number :	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Location :	Marquette	Lincoln	LaCrosse	Keweenaw	Grant	Door	Brown	Ashland	Jackson	Dane	Barre	Clatsop	Forest	Flora	1928	1929	1930	1931	1932	1933
Year First Found :	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934
Number :	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Location :	Marquette	Lincoln	LaCrosse	Keweenaw	Grant	Door	Brown	Ashland	Jackson	Dane	Barre	Clatsop	Forest	Flora	1928	1929	1930	1931	1932	1933
Year First Found :	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934
Number :	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Location :	Marquette	Lincoln	LaCrosse	Keweenaw	Grant	Door	Brown	Ashland	Jackson	Dane	Barre	Clatsop	Forest	Flora	1928	1929	1930	1931	1932	1933

Table No. 21
Infected Counties in Wisconsin Classified According to Year
Infection First Found, 1915.

Infections found in new counties during 1932:

On Ribes

1. Ashland County near High Bridge, Wisconsin. Infection found on one R. nigrum leaf of the fifteen bushes grouped together. Discovered by Putnam and Kouba on July 26, 1932.

2. Brown County, 2.7 miles west of city limits of Green Bay, Wisconsin, on state highway 29. Owner, Mrs. R. M. Burdon, Green Bay, Wisconsin, Route 5. R. cynosbati were lightly infected. Discovered by Kouba on October 5, 1932.

3. Door County, south edge of village of Jacksonport, Wisconsin. Very heavy infection on R. cynosbati and on escaped R. sativum. Found by Kouba on August 31, 1932.

4. Grant County, in Nelson Dewey State Park. Infection on two R. cynosbati bushes. Found by Kouba on October 14, 1932.

5. Kewaunee County, on hill, approximately 100 yards south of city limits of Dyckesville, Wisconsin. Property owner, Mr. Theophile Ropson, Route 5, Luxemburg, Wisconsin. Very light infection on R. cynosbati. Discovered by Kouba, October 5, 1932.

6. LaCrosse County, on U. S. highway 61 about 1/2 mile from the Vernon-LaCrosse County line. R. cynosbati fairly heavily infected. Found by Noel F. Thompson, deputy state nursery inspector, on October 25, 1932.

7. Lincoln County, approximately two miles south of Merrill, Wisconsin. Light infection on R. cynosbati bushes. Found by State Entomologist Chambers and Kouba on September 27, 1932.

8. Marinette County, approximately 1/2 mile southwest of Goodman, Wisconsin near Goodman Lumber Company forest tree nursery. Very heavy infection on R. cynosbati. Found by Kouba on August 12, 1932.

On White Pines.

1. Portage County. Rust was found in two woodlots; one infection center approximately 5 miles southwest of Amherst, Wisconsin, and the other infection center approximately 7 miles north of Amherst Junction, Wisconsin. Found by Atkins and Kouba on November 27, 1932.

2. Vernon County. Found by State Foreman Jacobson and Nursery Inspector Noel F. Thompson on pines belonging to Koethe Brothers. An old infection center dating back to about 1930. R. sativum were very heavily infected and R. americanum were lightly infected. Location, U. S. Highway 61, approximately 100 yards south of the LaCrosse-Vernon County line.

3. Wood County. Four pines were found infected on Nekoosa-Edwards Paper Company land across the river from Port Edwards, Wisconsin, Section 25, Township 22 North, Range 5 East. Five pines were also found infected at north edge of village of Port Edwards. Leaves that had fallen from R. nigrum

On Pines

1. Ashland County near High Bridge, Wisconsin. Infection found on one R. nigrum leaf of the fifteen bushes grouped together. Discovered by Putnam and Koubes on July 28, 1932.

2. Brown County, 2.7 miles west of city limits of Green Bay, Wisconsin, on state highway 22. Owner, Mrs. R. M. Burdon, Green Bay, Wisconsin, Route 5. R. cynosbati were lightly infected. Discovered by Koubes on October 5, 1932.

3. Door County, south edge of village of Jacksonport, Wisconsin. Very heavy infection on R. cynosbati and on escaped R. sativum. Found by Koubes on August 31, 1932.

4. Grant County, in Nelson Dewey State Park. Infection on two R. cynosbati bushes. Found by Koubes on October 14, 1932.

5. Keweenaw County, on hill, approximately 100 yards south of city limits of Dyckesville, Wisconsin. Property owner, Mr. Theophile Robson, Route 5, Luxemburg, Wisconsin. Very light infection on R. cynosbati. Discovered by Koubes, October 5, 1932.

6. Lacrosse County, on U. S. Highway 61 about 1 1/2 mile from the Vernon-Lacrosse County line. R. cynosbati fairly heavily infected. Found by Noel W. Thompson, deputy state nursery inspector, on October 25, 1932.

7. Lincoln County, approximately two miles south of Merrill, Wisconsin. Light infection on R. cynosbati bushes. Found by State Entomologist Chambers and Koubes on September 27, 1932.

8. Marinette County, approximately 1 1/2 mile southwest of Goodman, Wisconsin near Goodman Lumber Company forest tree nursery. Very heavy infection on R. cynosbati. Found by Koubes on August 12, 1932.

On White Pines

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2. Vernon County. Found by State Foreman Jacobson and Nursery Inspector Noel I. Thompson on pines belonging to Roethe Brothers. An old infection center dating back to about 1930. R. sativum were very heavily infected and R. americanum were lightly infected. Location, U. S. Highway 61, approximately 100 yards south of the Lacrosse-Vernon County line.

3. Wood County. Four pines were found infected on Lakona-Edwards Paper Company land across the river from Fort Edwards, Wisconsin, Section 25, Township 22 North, Range 5 East. Five pines were also found infected at north edge of village of Fort Edwards. Leaves that had fallen from R. nigrum

bushes at Wisconsin Rapids showed extremely heavy infection. These bushes were located about 50 yards east of the east end of the dam of the Wisconsin River. Found by Kouba on April 4, 1932.

WHITE PINE ACREAGE.

Much of the early wealth of Wisconsin was derived from her forests. The erection of the first sawmill in Wisconsin on Devil's River in 1809 was the beginning of the lumber industry which has had much to do with the rapid development of the state. From 1899 to 1904 Wisconsin lead all the states of the Union in the production of lumber. The peak year, however, was reached in 1892 when more than 4,000,000,000 board feet were cut. White pine was the most valuable tree of the virgin forest and up to 1900 almost the entire lumber cut of Wisconsin consisted of white pine.

According to the best estimates at the present time approximately 756,315 acres of native white pine exist. Of this total approximately 487,945 acres consist of stands well stocked with white pine while 268,370 acres consist of scattered pine. These stands, although largely immature, are of considerable immediate and potential value. A few acres of the original virgin stands of white pine may be seen on the Menominee Indian Reservation near Shawano as evidence of what the forests were like on millions of acres in Wisconsin before the era of lumbering.

In Table No. 22 there is shown the acreage of well stocked stands of white pine by counties at the present time according to the best estimates available.

In addition to the acreage of white pine shown in Table No. 22 many hundreds of thousands of acres of excellent white pine planting sites exist in the state. These areas, once supporting excellent stands of white pine, are now, due to repeated fires, practically treeless. Many of these excellent white pine planting sites are nearly or entirely Ribes-free. All areas on which white pine planting is contemplated should be gone over beforehand for Ribes. The blister rust organization will be glad to furnish such service to the extent of its ability.

RIBES ERADICATION.

In Table No. 23 there is shown the summary of local control performed in Wisconsin in 1932.

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RIBES ERADICATION.

In Table No. 23 there is shown the summary of local control performed in Wisconsin in 1932.

Table No. 22

*Estimated Acreage of Well Stocked Stands of White Pine
by Counties.

: County	: Acres of : White Pine	: County	: Acres of : White Pine	:
: Adams	: 6,400	: Marinette	: 19,100	:
: Ashland	: 14,600	: Marquette	: 2,475	:
: Barron	: 7,840	: Milwaukee	: 1,260	:
: Bayfield	: 23,765	: Monroe	: 7,800	:
: Brown	: 3,050	: Oconto	: 12,250	:
: Buffalo	: 750	: Oneida	: 21,400	:
: Burnett	: 7,400	: Outagamie	: 3,750	:
: Chippewa	: 7,950	: Ozaukee	: 1,840	:
: Clark	: 4,640	: Pepin	: 1,465	:
: Columbia	: 2,910	: Pierce	: 2,785	:
: Dane	: 1,975	: Polk	: 9,400	:
: Door	: 3,800	: Portage	: 6,770	:
: Douglas	: 13,200	: Price	: 16,880	:
: Dunn	: 4,165	: Rusk	: 11,500	:
: Eau Claire	: 2,750	: Sauk	: 3,900	:
: Florence	: 11,570	: Sawyer	: 42,540	:
: Forest	: 13,845	: Shawano	: 38,455	:
: Green Lake	: 2,480	: Sheboygan	: 5,390	:
: Iron	: 8,940	: St. Croix	: 3,545	:
: Jackson	: 7,150	: Taylor	: 8,650	:
: Juneau	: 6,500	: Trempealeau	: 900	:
: Kewaunee	: 2,200	: Vilas	: 33,500	:
: LaCrosse	: 2,650	: Washburn	: 8,550	:
: Langlade	: 5,995	: Waupaca	: 7,900	:
: Lincoln	: 11,300	: Waushara	: 4,780	:
: Manitowoc	: 6,150	: Wood	: 7,100	:
: Marathon	: 14,650	: Remaining Counties	: 5,435	:
: Total acres good white pine			487,945	:
: Estimated acres scattered white pine.			268,370	:
: Total acres white pine			756,315	:

*Based on records from Land Economic inventory, Blister Rust Control files, Conservation Department, observations of agents, etc.

Estimated Acreage of Well Stocked Stands of White Pine
by Counties.

County	White Pine	Acreage of
Adams	6,400	19,100
Ashland	14,600	2,475
Barton	7,840	1,280
Bayfield	23,785	7,800
Brown	3,050	12,250
Buffalo	750	21,400
Burnett	7,400	2,750
Chippewa	7,950	1,840
Clark	4,640	1,465
Columbia	2,910	2,785
Dane	1,975	9,400
Door	3,800	6,770
Douglas	12,200	16,280
Dunn	4,165	11,500
Man Claire	2,750	2,900
Florence	11,270	42,540
Forest	12,845	38,455
Green Lake	2,480	2,380
Iron	8,940	2,545
Jackson	7,150	8,650
Juneau	6,500	900
Keweenaw	2,200	38,200
Lacrosse	2,650	8,550
Lanai	2,995	7,900
Lincoln	11,300	4,790
Manitowish	6,150	7,100
Marathon	14,650	2,435
Total acres good white pine		487,945
Estimated acres scattered white pine		238,370
Total acres white pine		726,315

*Based on records from Land Economic Inventory, Blister Rust Control files, Conservation Department, observations of agents, etc.

Table No. 23.

Local Control Performed Wisconsin-1932.

	: Acres:	: Ribes Pulled :	Costs						: State	: Per Acre
			: White:	: City	: Shawano:	: County:	: Markets:	: Dept.		
: No. of	: Pro- of	: Acres:	: Job- s:	: Wild	: Cult.	: duals	: Agri.	: Conser-	: vation	: Total
: Cooperator	: Jobs:	: Worked:	: Acres:	: Acres:	: Acres:	: Acres:	: Acres:	: Acres:	: Acres:	: Acres:
: Individuals	: 131:	: 4,117:	: 13,526:	: 819,593	: 114	: \$642.20	: \$826.65:	: \$1,721.92:	: -	: \$3,190.77:
: City Parks	: 1:	: 59:	: 64:	: 81,101	: -	: 262.00	: -	: 101.00:	: -	: 363.00:
: State Parks	: 3:	: 1,220:	: 3,547:	: 321,651	: -	: -	: -	: -	: (d)	: 1,969.55:
: State	: :	: :	: :	: :	: :	: :	: :	: :	: (e)	: :
: Reforestation	: :	: :	: :	: :	: :	: :	: :	: :	: 200.00:	: :
: Camp (prison	: :	: :	: :	: :	: :	: :	: :	: :	: (f)	: :
: labor)	: 1:	: 900:	: 1,320:	: 127,768	: -	: -	: -	: -	: 355.80:	: 555.80:
: Total	: 136:	: 6,296:	: 18,457:	: 1,350,113	: 114	: \$904.20	: \$826.65:	: \$1,822.92:	: \$2,525.35:	: \$6,079.12:

(a) Based on \$1.00 per day labor furnished by individual pine owners.

(b) Based on \$1.00 per day labor furnished by city.

(c) Based on \$1.00 per day contributed by county.

(d) Based on \$2.40 per day labor.

(e) Based on \$3.00 per day for foreman to supervise prison labor.

(f) Based on \$1.00 per day value of prison labor.

[illegible]

A decided difference in the per acre costs and number of Ribes on the different kinds of jobs is evident. The costs varied from less than 24¢ per acre on lands belonging to individuals, to \$5.67 on a city park owned by the City of Superior. The Ribes per acre on these two kinds of jobs range from practically 61 to 1,267 per acre. Owing to the fact that white pine stands occurred as scattered woodlots of 20 to 80 acres, it was necessary to cover for Ribes approximately 3 acres in order to protect one acre of white pine.

In Table No. 24 there is shown in summary form local control work done in Wisconsin from 1918 to 1932 inclusive.

Table No. 24.

Summary By Years of Ribes Eradication Work - Wisconsin. 1918 to 1932 Inc.

: Year :	Acres Worked :			Ribes Pulled :		Total	Cost :		
:	:	2nd :	:	:	:	:	Per Acre	Per By.	:
: Year :	Initial:	Erad.:	Total :	Wild :	Cult.:	Cost	Cost	Ribes:	(cents) :
: 1918 :	220:	0:	220:	24,000:	0:	\$500.00:	\$2.273:	109.1:	2.08¢ :
: 1919 :	75:	0:	75:	5,844:	0:	138.59:	1.848:	77.9:	2.37 :
: 1920 :	10,995:	0:	10,995:	775,576:	0:	5,708.24:	0.519:	70.5:	0.74 :
: 1921 :	8,887:	0:	8,887:	457,074:	19:	3,620.84:	0.407:	51.4:	0.79 :
: 1922 :	4,770:	0:	4,770:	530,953:	5:	3,007.94:	0.631:	111.3:	0.57 :
: 1923 :	3,337:	10:	3,347:	204,043:	0:	2,671.98:	0.798:	61.0:	1.31 :
: 1926 :	58:	150:	208:	51,878:	0:	700.00:	3.366:	249.4:	1.35 :
: 1927 :	200:	50:	250:	42,226:	0:	1,112.24:	4.449:	168.9:	2.63 :
: 1928 :	347:	0:	347:	79,861:	0:	1,045.85:	3.014:	230.1:	1.31 :
: 1929 :	120:	60:	180:	18,744:	0:	771.05:	4.284:	104.1:	4.11 :
: 1930 :	491:	0:	491:	164,485:	0:	969.10:	1.974:	335.0:	0.59 :
: 1931 :	3,387:	580:	3,967:	313,515:	324:	1,999.03:	0.504:	79.1:	0.64 :
: 1932 :	18,457:	0:	18,457:	1,350,113:	114:	6,079.12:	0.329:	73.2:	0.45 :
: Totals :	51,344:	850:	52,194:	4,018,312:	462:	28,323.98:	0.543:	77.0:	0.70 :

In the last column of Table No. 24 there is shown the cost per bush in cents. While too much emphasis must not be placed upon this figure, nevertheless it may be interesting to compare the cost per bush pulled by years. It may be noted that with the exception of the year 1922 the three years from 1930 to 1932 inclusive showed the lowest cost per bush pulled and the year 1932 the lowest cost for all years. The highest cost per bush pulled came in the years 1929, 1927, 1919 and 1918, years when wages were relatively high.

The eradication cost of practically 33¢ was the lowest in 1932 of any of the years since work has been done. Although the number of Ribes per acre, 73, was only slightly under the average of 77 bushes for the entire period, the low cost in 1932 was due largely to low wages paid for labor, the use of unemployed on control projects and increased efficiency of work due to greater experience.

Approximately 35 per cent of the entire acreage covered from 1918 to 1932 inclusive was worked in 1932. Contrary to expectations at the beginning

A decided difference in the per acre costs and number of Ribes on the different kinds of jobs is evident. The costs varied from less than \$4 per acre on lands belonging to individual, to \$5.57 on a city park owned by the City of Superior. The Ribes per acre on these two kinds of jobs range from practically 31 to 1,387 per acre. Owing to the fact that white pine stands occurred as scattered woodlots of 20 to 80 acres, it was necessary to cover for Ribes approximately 3 acres in order to protect one acre of white pine.

In Table No. 24 there is shown in summary form local control work done in Wisconsin from 1918 to 1932 inclusive.

Table No. 24.

Summary By Years of Ribes eradication work - Wisconsin, 1918 to 1932 Inc.

Year	Initial	Final	Total	Wild	Cost	Total	Per Acre	Per Sq. Y.	Cost
1918	0	0	220	24,000	0	200.00	2.273:102.1	2.084	
1919	0	0	75	5,844	0	136.59	1.848:77.9	2.37	
1920	0	0	10,925	775,578	0	5,708.24	0.519:70.2	0.74	
1921	0	0	8,887	457,074	19	3,820.24	0.407:51.4	0.79	
1922	0	0	4,770	250,928	2	3,007.24	0.631:111.3	0.27	
1923	10	3,347	204,042	0	2,671.98	0.798:61.0	1.31		
1924	150	208	51,878	0	700.00	3,306:249.4	1.32		
1925	200	250	42,236	0	1,112.24	4,419:192.9	2.62		
1926	0	0	347	79,861	0	1,045.35	3.014:230.1	1.31	
1927	60	180	18,744	0	771.05	4,384:104.1	4.11		
1928	0	0	491	184,488	0	969.10	1.674:335.0	0.59	
1929	0	0	280	315,515	1	999.03	0.504:79.1	0.64	
1930	0	0	18,457	1,350,113	114	6,079.18	0.329:78.2	0.45	
Totals	21,344	850:52,194.4	0.18,512	482:28,323.98	0.543	77.0	0.70		

In the last column of Table No. 24 there is shown the cost per bush in cents. While too much emphasis must not be placed upon this figure, nevertheless it may be interesting to compare the cost per bush pulled by years. It may be noted that with the exception of the year 1923 the three years from 1920 to 1932 inclusive showed the lowest cost per bush pulled and the year 1922 the lowest cost for all years. The highest cost per bush pulled came in the years 1929, 1927, 1919 and 1918, years when wages were relatively high.

The eradication cost of practically 334 was the lowest in 1932 of any of the years since work has been done. Although the number of Ribes per acre, 75, was only slightly under the average of 77 bushes for the entire period, the low cost in 1932 was due largely to low wages paid for labor, the use of unemployed on control projects and increased efficiency of work due to greater experience.

Approximately 25 per cent of the entire acreage covered from 1918 to 1932 inclusive was worked in 1932. Contrary to expectations at the beginning

of the year, a large number of cooperative control jobs were lined up. It was believed that due to the depression cooperative control would be difficult to obtain but just the opposite condition developed.

In Waupaca and Shawano Counties alone some 300 pine owners showed a willingness to furnish labor to protect their pine stands. With the limited funds at hand for furnishing supervision and state foremen, it was not possible to perform all the control jobs that were lined up. The work not completed, however, in 1932 will probably be done in 1933.

That only a small beginning in initial protection work has been afforded the white pines of Wisconsin is evident from Table No. 25. To date only 4.4 per cent of the "good" white pine stands have been initially protected.

Table No. 25.

Status of Local Control in Wisconsin
at End of 1932.

Acres of "good" white pine	487,945
Acres of "scattered" white pine	<u>268,370</u>
Total acres white pine	756,315
Acres white pine initially protected(1918-1932).	21,528
Per cent "good" white pine initially protected .	4.4
Per cent total acres white pine initially protected	2.8

USE OF RELIEF LABOR ON BLISTER RUST CONTROL PROJECTS.

The relatively large amount of acreage covered for Ribes in Wisconsin during 1932 is largely due to the use of men from the unemployed lists on control projects. In Table No. 26 there is shown a summary statement of the use of the unemployed on control projects during 1932.

There follows a discussion of the use of men from the unemployed lists on the various projects.

Individual Pine Owners.

State funds were insufficient to furnish foremen to supervise the large number of control jobs lined up as a result of the white pine survey during the winter of 1931-1932. It was therefore necessary to initiate a new policy for handling the work. An agreement was made with Shawano County officials whereby unemployed men from the county relief list could be used in blister rust control work. One man from each of six townships and later from four additional townships were chosen by the county poor commissioner for control work. These men were given an intensive 8 days of training during which they were taught to recognize the different Ribes species, the reason for Ribes eradication, and how to handle a Ribes eradication crew. Each man received the equivalent of \$1 per day in food and clothing from the

of the year, a large number of cooperative control jobs were lined up. It was believed that due to the depression cooperative control would be difficult to obtain but just the opposite condition developed.

In Waupaca and Shawano Counties alone some 500 pine owners showed a willingness to furnish labor to protect their pine stands. With the limited funds at hand for furnishing supervision and state foremen, it was not possible to perform all the control jobs that were lined up. The work not completed, however, in 1932 will probably be done in 1933.

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USE OF RELIEF LABOR ON DISTRICT PEST CONTROL PROJECTS.

The relatively large amount of acreage covered for Ribes in Wisconsin during 1932 is largely due to the use of men from the unemployed lists on control projects. In Table No. 26 there is shown a summary statement of the use of the unemployed on control projects during 1932.

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Table No. 26.

Use of Men From Unemployed Lists in Blister Rust control Work in Wisconsin, 1932.

County	Project	Acres	Worked	Employed	Days	By Whom	Rate	Per	How Paid	Amount of Pay	Total
	Individual pine owners										
	within county and nur-					State	\$1.00	Cash		\$1,168.00	
Shawano	very sanitation work	13,746	10	1,168	County	1.00	Credit			1,168.00	\$2,336.00
Douglas	Pattison State Park		250	6	290	State	2.40	Cash		696.00	696.00
	Potowatomi and										
Door	Peninsula State Parks	3,297	15	542 $\frac{1}{2}$	State	2.40	Cash			1,302.00	1,302.00
						City of					
Douglas	Dietrick Park		64	32	282	Superior	4.00	Credit		1,048.00	1,048.00
	Totals		17,357	63	2,282 $\frac{1}{2}$						\$5,382.00

• OFF FIRST

Stiel, dieses in die Luft und in die Erde zu werfen.

[illegible]

county and \$1 per day in cash, plus gas and oil from the state for his automobile in use on official business.

After the training period the men were sent out to direct the labor furnished by the pine owners. These men were closely supervised by a state foreman who checked their work daily.

This method of obtaining foremen from the unemployed lists and using them under the close supervision of a trained "super-foreman" proved highly successful. Excellent Ribes eradication work was done and the men took an active and intelligent interest in their work. This type of cooperative control started on May 4 and continued until October 8.

State Parks.

Blister rust control in 1932 was performed in three state parks, namely, the Pattison State Park in Douglas County and Potowatomi and Peninsula State Parks in Door County. Funds for the work were allotted by the Wisconsin Conservation Department. Local labor was used. Here again unemployed men who were especially in need of work were given preference. During the season 21 men were given temporary employment. Most of the men had been previously employed by the Conservation Department and were therefore already on the approved list of the Wisconsin Bureau of Personnel. These men had been supervised in crew formation in connection with reforestation and required a minimum of training on blister rust control work. The men were paid at the rate of \$2.40 in cash per 8-hour day.

City Parks.

Thirty-two unemployed men supported by the City of Superior, were used by the city on Ribes eradication work in Dietrick Park. For a day's work each man received \$4 credit from the city toward food and clothing supplied by municipal poor relief. From a central meeting place each morning the men were transported to and from work by a city truck. The "stagger system" of employment was used and no man was assigned to Ribes eradication work for more than one week.

In general, the work done by these men was poor. The attitude of many of them was that of indifference because the city had been furnishing the necessities of life regardless of whether they worked or not. The result of this system was that only 10 to 20 per cent of the men notified turned out to work for the food and clothing they had already received.

During the latter part of the summer the system was changed so that the men's compensation came in the form of credit to be supplied in the future. This latter system proved to be more effective and better work was done.

The Ribes eradication work in Dietrick Park was particularly difficult and expensive. Ribes were especially abundant; approximately 81,101 bushes were pulled from the 64 acres covered. In some instances the state foremen found it necessary to have the crew rework certain areas two or three times.

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Use of Prison Labor on Blister Rust Control Work.

At the McNaughton State Prison camp in Oneida County, a group of 20 prisoners worked 1,320 acres to protect 900 acres of white pine. These men were a part of a contingent of some 50 prisoners who were engaged in reforestation for the Wisconsin Conservation Department and Board of Control. Twenty Ribes eradicators worked under the immediate direction of a state blister rust foreman. Because the prisoners refused to take orders from each other the state foreman adopted a plan to meet the situation. Fourteen men worked in line as one crew instead of the usual 3 to 5 men, the spacing between the men being about 4 feet. The two end men hung paper trails and took up paper as usual. Four of the most conscientious and reliable of the prison crew were used back of the line as checkers. A checker would order no lineman back when a bush was missed but would pull the bush out himself. The state foreman worked immediately back of the checkers. The group as a whole proved to be easy to manage. The use of prison labor in Ribes eradication work has unusually good possibilities and should be continued.

NURSERY SANITATION.

White pine is used extensively in Wisconsin for reforestation purposes. It is highly important, therefore, that all white pine-growing nurseries are free from blister rust and so treated that the pines in the nursery cannot become infected. Sanitation of a white pine nursery consists in removing all Ribes within 1,500 feet of the nursery and cultivated black currants for a distance of one mile. This Ribes-free condition should be maintained by yearly examination.

In Table No. 27 there is shown a statement of all nursery sanitation work done in Wisconsin to and including 1932.

It may be noted that of the six nurseries listed as having been put in a sanitary condition two of them were private nurseries, two were state and two belonged to the Federal Government.

It may also be observed that nursery sanitation work was done in 1932 around five nurseries. The owners and managers of these nurseries have signified their willingness and desire to have their nurseries gone over annually for Ribes.

In Table No. 28 there are listed the principal private nurseries producing white pine. No sanitation work has been done around these nurseries but such work is contemplated this coming year around certain ones.

At the McLaughlin State Prison camp in Oneida County, a group of 50 prisoners worked 1,320 acres to protect 900 acres of white pine. These men were a part of a contingent of some 50 prisoners who were engaged in reforestation for the Wisconsin Conservation Department and Board of Control. Twenty Ribes eradicators worked under the immediate direction of a state blaster rust foreman. Because the prisoners refused to take orders from each other the state foreman adopted a plan to meet the situation. Fourteen men worked in line as one crew instead of the usual 3 to 5 men, the spacing between the men being about 4 feet. The two end men hung paper trails and took up paper as usual. Four of the most conscientious and reliable of the prison crew were used back of the line as checkers. A checker would order no line an back when a bush was missed but would pull the bush out himself. The state foremen worked immediately back of the checkers. The group as a whole proved to be easy to manage. The use of prison labor in Ribes eradication work has unusually good possibilities and should be continued.

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Table No. 27

Nurseries Producing White Pine and Status of Nursery Sanitation, Wisconsin, 1932.

Name and Location (Federal, State or Private)	White Pines; in Nursery (1932)	Eradication			Costs			Remarks
		1st: or 2nd:	Date:	Wild : Cult.:	Federal: State: Private:	Total:		
Forest Service Nur- sery (F.S.) Rhineland	2,500,000	1st:1931: 2nd:1932:	400 : 2,512 : 400 : 1,136 :	0 : 0 :	\$28.80 : 105.00 : (F.S.) :	\$25.00 : 95.00 : :	0 : 0 :	To be gone over yearly.
Menominee Indian Res- ervation Nursery Keshena (I.S.)	5,000	1st:1923: 2nd:1932:	230 : 89,744 : 220 : 73,836 :	0 : :	200.00 : 160.00 : (U.S.) : I.S.) :	0 : 74.14 : :	0 : 22.00 : (County)	Need reworking soon. Ribes infec- tion within sani- tation zone 1932.
Trout Lake Nursery (State) Trout Lake	2,000,000	1st:1931: 2nd:1932:	203 : 3,796 : 160 : 2,047 :	0 : 0 :	0 : 0 : (Cons. Dept.) :	33.30 : 35.00 : :	33.30 : 0 :	Systematic exami- nation yearly.
State Forest Nursery (State) Wisconsin Rapids.	Begun 1932	1st:1932:	290 : 1,803 : 16	:	0 : 0 :	0 : 0 :	0 :	Nursery just started 1932.
Nekoosa-Edwards Paper Co. Port Edwards (Private)	2,000,000	1st:1931: 2nd:1932:	88 : 185 :	8 : 0 : 0 : 0 :	0 : 0 :	8.00 : 0 :	4.05 : 0 :	Naturally a poor Ribes site. No charge 1932. Work done by State Leader.
McKay Nursery Co. (Private) Waterloo and Portland	5,000	1st:1927:	400 : 940 : 165	:	0 : 0 :	150.00 : 300.00 :	150.00 : 300.00 :	Information in- complete. Where figures were lack- ing an estimate was listed.

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Table No. 28.

Nurseries Producing White Pine, All Private Nurseries. No Nursery
Sanitation Work Done, Wisconsin, 1932.

: Name and Location		: White Pines in:	: Name and Location		: White Pines in:
		: Nursery, 1932.			: Nursery, 1932.
: Goodman Lumber Co., (1)	:		: Evergreen Nurseries,	:	
: Goodman	:	: 50,000	: Inc., Milwaukee	:	: 200
: American Forestry Co.,	:		: Dahlberg Nursery,	:	
: Pembine	:	: 6,000	: Labyrinth	:	: 500
: Coe, Converse & Edwards	:		: August Nuberg,	:	
: Co., Fort Atkinson	:	: 5,000 or less	: Whitehall	:	: 200
: Baker Seed & Nursery Co.,	:		: Wayside Nursery, North	:	
: Fond du Lac	:	: 5,000 or less	: Milwaukee	:	: 1,000 or less
: White Elm Nursery,	:		: Stadler Nursery,	:	
: Hartland	:	: 5,000 or less	: Middleton	:	: 1,000 or less
: Great Northern Nursery	:		: Flowerwood Nurseries,	:	
: Baraboo	:	: 5,000 or less	: Madison	:	: 500 or less
: Northwood Nurseries	:		:	:	
: (Koethe Bros.), (2)	:		: Lawrence G. Holmes &	:	
: Coon Valley	:	: 500 or less	: Co., Beloit	:	: 100
: Fancher's Nursery,	:		: John Wolf (Fair Assoc.)	:	
: Sturtevant	:	: 5,000 or less	: Chippewa Falls	:	: 2,000
: Evergreen Nursery Co.,	:	: 150	: Roy Smutny,	:	
: Sturgeon Bay	:		: Friendship	:	: 100
: North Star Nursery,	:		: Howard O. Taylor	:	
: Powderville	:	: 5,000 or less	: Kenosha	:	: 100
: Sommers Nursery,	:		: Riverside Nurseries,	:	
: Milwaukee	:	: 100	: Thiensville	:	: 500 or less
: Rasmussen's Fruit Farm,	:		: Harry Winterfield,	:	
: Oshkosh	:	: 5,000 or less	: Millston	:	: 5,000 or less
:	:		: Rexford Evergreen	:	
: Roe Nurseries, Oshkosh	:	: 2,000	: Nursery, Shiocton	:	: 5,000 or less
: R. H. Nortman, Black	:		: Joe Rucinski,	:	
: River Falls	:	: 170	: Rothschild	:	: 1,000 or less
: Lake Geneva Nursery,	:		: Lake Geneva Creeping	:	
: Williams Bay	:	: 1,000	: Bent Nurs., Lake Geneva	:	: 500

(1) Ribes infection found 1932 within 100 feet of nursery.

(2) Pine infection dating back to at least 1921 found in nursery in 1932.

This is an old nursery, not operating now.

Table No. 28.

Nurseries Producing White Pine, All Private Nurseries. No Nursery
 Examination Work Done, Wisconsin, 1932.

Name and Location	White Pine in Nursery, 1932.	White Pine in:
Goodman Lumber Co., (1)	50,000	Inc., Milwaukee
Goodman	50,000	Evergreen Nurseries
American Forestry Co.,	5,000	Dahlberg Nursery
Pine	5,000	Labyrinth
Co., Converse & Edwards		August Hubert
Co., Fort Atkinson	5,000 or less	Witchell
Baker Seed & Nursery Co.,		Lynde Nursery, North
Fort du Lac	5,000 or less	Milwaukee
White Elm Nursery,		Stadler Nursery
Harland	5,000 or less	Middleton
Great Northern Nursery		Flowerwood Nurseries
Baraboo	5,000 or less	Madison
Northwood Nurseries		
(Koebe Bros.), (2)		Lawrence G. Holmes &
Coon Valley	500 or less	Co., Beloit
Farmer's Nursery,		John Wolf (Fair Assoc.)
Survivant	5,000 or less	Chippewa Falls
Evergreen Nursery Co.,	150	Roy Gentry
Sturgeon Bay		Friendship
North Star Nursery,		Howard O. Taylor
Porterville	5,000 or less	Kenosha
Somers Nursery,		Riverside Nurseries
Milwaukee	100	Winnebago
Hammann's Fruit Farm,		Harry Winterfield
Oshkosh	5,000 or less	Millston
		Nexford Evergreen
Roe Nurseries, Oshkosh	5,000	Nursery, Shiocton
R. H. Norton, Black		Joe Rusinski
River Falls	170	Rothschild
Lake Geneva Nursery,		Lake Geneva Greening
William Bay	1,000	Bent Mrs., Lake Geneva

(1) Pines infection found 1932 within 100 feet of nursery.
 (2) Pine infection dating back to at least 1921 found in nursery in 1932.
 This is an old nursery, not operating now.

INVESTIGATIONAL ACTIVITIES.

Evidence of Disease Control.

One example of the effectiveness of Ribes eradication in controlling blister rust is located in Interstate Park in Polk County, the first county in which blister rust was discovered. Blister rust has probably been present in this park since 1917. Ribes eradication work was initially done in 1920 and worked for the second time in 1931. In 1920 infected trees were also cut out. In 1931 a survey disclosed the fact that 99.5 per cent of the white pine reproduction in the park was free from blister rust. In contrast to the results shown by a check of the Interstate Park area, a pine woodlot in Barron County was examined where no protection measures had been applied prior to 1931. The data show that only 52 per cent of the pine reproduction was free from disease. Over small areas only 15 per cent of the pines were healthy. At the rate at which healthy pines were succumbing, within a few years the entire stand might have been completely destroyed if protection measures had not been applied in 1931.

Susceptibility of the Alpine Currant.

The Alpine currant (R. alpinum L.) is widely used as an ornamental shrub in Wisconsin. It has the reputation of being extremely resistant to blister rust. A study of its susceptibility under field conditions in Wisconsin was started in 1932. Six bushes of R. alpinum were planted in a heavy blister rust infection center in Shawano County in the spring of 1932. There were present hundreds of cankers producing aecia, some of which were within a few feet of the planted R. alpinum. Several bushes of R. cynosbati were in the immediate vicinity and were used as check plants.

Observations of the Ribes on this susceptibility plot were made several times throughout the summer and autumn. No infection was found on any of the R. alpinum bushes. This was in contrast to R. cynosbati which were so heavily infected that they became defoliated by the middle of August. This study is being continued.

Experimental Chemical Eradication.

In order to test the feasibility of using chemicals in Ribes eradication, a small experiment was conducted in Wisconsin under the direction of Mr. G. E. Draper under the Division of Blister Rust Control. His report on this work is shown following:

"Summary of Ribes Experiments Performed at Shawano and Keshena, Wisconsin in 1932.

"During the months of July and August 1932, plans were formulated jointly by Mr. S. B. Detwiler and Mr. F. C. Meier for a field experiment with chemicals on Wisconsin Ribes. The work was conducted by G. E. Draper with the assistance of H. N. Putnam, Supervisor of the Lake States region and T. F. Kouba, State Leader for Wisconsin. Four unskilled laborers were employed for the spraying job.

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One example of the effectiveness of disease eradication in controlling blister rust is located in Interstate Park in Polk County, the first county in which blister rust was discovered. Blister rust has probably been present in this park since 1917. Disease eradication work was initially done in 1920 and worked for the second time in 1931. In 1930 infected trees were also cut out. In 1931 a survey disclosed the fact that 92.5 per cent of the white pine reproduction in the park was free from blister rust. In contrast to the results shown by a check of the Interstate Park area, a pine woodlot in Marion County was examined where no protection measures had been applied prior to 1931. The data show that only 52 per cent of the pine reproduction was free from disease. Over small areas only 10 per cent of the pines were healthy. At the rate at which healthy pines were succumbing, within a few years the entire stand might have been completely destroyed if protection measures had not been applied in 1931.

Susceptibility of the Alpine Currant.

The Alpine currant (*R. alpinum* L.) is widely used as an ornamental shrub in Wisconsin. It has the reputation of being extremely resistant to blister rust. A study of its susceptibility under field conditions in Wisconsin was started in 1932. Six bushes of *R. alpinum* were planted in a heavy blister rust infection center in Shawano County in the spring of 1932. There were present hundreds of cankers producing acids, some of which were within a few feet of the planted *R. alpinum*. Several bushes of *R. cynosbati* were in the immediate vicinity and were used as check plants.

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"The purpose of the experiment was to test in a preliminary fashion the effectiveness of sodium chlorate and ammonium thiocyanate on Wisconsin Ribes when such chemicals were applied according to best known field practice. On the basis of claims set forth by its manufacturers, calcium chloron, a proprietary weed killer, was subsequently included in the list of chemicals to be tested. While it was recognized that application of these chemicals by an inexperienced crew on a relatively small scale would not provide adequate basis for comparing the cost of chemical and hand work it was considered desirable to keep cost records of the experiment for future reference.

"With these objectives in mind, Messrs. Putnam and Kouba located several areas at Shawano and Keshena, Wisconsin to be used for the experiments.

Description of Plots and Method of Treatment.

"Area I was located north of Shawano on the Menominee Indian Reservation. The area was typical swamp land containing a number of patches of R. glandulosum and a few scattered bushes of R. cynosbati. All applications of chemicals to Area I were made by means of the knapsack spray unit developed by the Western Office of the Division of Blister Rust Control. The men were given preliminary instructions and a practical demonstration in its use. Each crewman then applied 8 gallons of the 11 per cent sodium chlorate solution to a small area of R. glandulosum, thus acquainting him with the use of spraying equipment as well as the characteristics of the Ribes.

"Area I had previously been staked off and laid out into parallel lanes 6 to 8 feet wide by means of string. Each lane was then carefully worked by one man followed by a checker. A checker supervised the work of two crewmen. It should be noted that R. glandulosum was fast becoming dormant and that a large share of the leaves had already fallen. A few R. cynosbati that were found on this area were also sprayed.

"Area III was located three or four hundred yards away from Area I in the same wood-lot. Boundaries of this area were marked by blazed trees. These plots contained only R. cynosbati which were treated with solid calcium chloron. String lines were not laid down because the bushes were easily found and the white color of calcium chloron made it easy to tell which bushes had been treated. The dry chemical was carried in 5-quart pails and was ladled out with 6-inch frying pans. The men covered the area in strips walking four abreast and four to six feet apart. The writer checked behind them to catch missed bushes and to take a count of the number of bushes treated.

"In the use of calcium chloron, considerable annoyance was experienced by the workers by reason of the fine powdery nature of the compound. The dust which came into contact with the moist mucuous membranes of the nose and throat was very irritating.

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"Area I had previously been staked off and laid out into parallel lanes 6 to 8 feet wide by means of string. Each lane was then carefully worked by one man followed by a checker. A checker supervised the work of two crewmen. It should be noted that R. glandulosum was first becoming dormant and that a large share of the leaves had already fallen. A few R. cynosbati that were found on this area were also sprayed.

"Area III was located three or four hundred yards away from Area I in the same wood-lot. Boundaries of this area were marked by blazed trees. These plots contained only R. cynosbati which were treated with solid calcium chloron. String lines were not laid down because the bushes were easily found and the white color of calcium chloron made it easy to tell which bushes had been treated. The dry chemical was carried in 5-quart pails and was lalled out with 6-inch frying pans. The men covered the area in strips walking four abreast and four to six feet apart. The writer checked behind them to catch missed bushes and to take a count of the number of bushes treated.

"In the use of calcium chloron, considerable annoyance was experienced by the workers by reason of the fine powdery nature of the compound. The dust which came into contact with the moist mucous membranes of the nose and throat was very irritating.

"Area IV was located 16 miles northwest of Keshena, Wisconsin. This region had been logged about 1915 and burned over shortly thereafter. The land, covered quite thickly with brush and young trees, was quite wet and was bordered on the north side by a shallow creek. The area was marked off into chain square plots which were subsequently divided into 6 to 8 foot lanes by means of string lines. Two men were assigned to each lane. The first one was equipped with a knapsack unit having the extension rod and spray nozzle replaced by a one-fourth inch gas pipe fitted with a pointed steel tip in which a small hole was bored. Each bush was given a subsurface drench by running the prod just under the surface of forest litter or soil. Each hole was given one to three strokes of the pump depending on the size of the bush. Each bush received one or more prods immediately around the crown and a series of prods four to six inches from the crown. The number of holes used depended on the size of the bush. The second man followed with a knapsack spray unit, and covered each bush with a mist spray. A checker was employed to supervise the work of each two-man crew. Data covering the experiments are given in Tables No. 1, 2 and 3.

"Area IV was located 16 miles northwest of Keshena, Wisconsin. This region had been logged about 1915 and burned over shortly thereafter. The land, covered quite thickly with brush and young trees, was quite wet and was bordered on the north side by a shallow creek. The area was marked off into chain square plots which were subsequently divided into 6 to 8 foot lanes by means of string lines. Two men were assigned to each lane. The first one was equipped with a knapsack unit having the extension rod and spray nozzle replaced by a one-fourth inch gas pipe fitted with a pointed steel tip in which a small hole was bored. Each bush was given a subsurface trench by running the prod just under the surface of forest litter or soil. Each hole was given one to three strokes of the pump depending on the size of the bush. Each bush received one or more prods immediately around the crown and a series of prods four to six inches from the crown. The number of holes used depended on the size of the bush. The second man followed with a knapsack spray unit, and covered each bush with a mist spray. A checker was employed to supervise the work of each two-man crew. Data covering the experiments are given in Tables No. 1, 2 and 3.

Table No. 1.

Summary of Spraying Experiments on Ribes Performed at Shawano and Keshena, Wisconsin in 1932.

Location	Size of Plot	Date of Application	Chemical Used	Concentration in Lbs. per Gallon	Quantity of Chemical Applied	Total Feet of Live Stem or Total Number of Bushes Treated	Method of Application	Time Consumed
Area I	0.4	8/23/32	Sodium chlorate*	1	78 gals.	2,725 F.L.S.	Spray: ground & stems	16½
Area I	0.4	8/23/32	Ammonium thiocyanate	1	32 gals.	1,300 F.L.S.	do	9¾
Area II	0.4	8/23/32	Ammonium thiocyanate	1	32 gals.	1,300 F.L.S.	do	9¾
Practice Plot								
Approximately:								
1 Chain Sq.		8/22/32	Sodium chlorate*	1	32 gals.	No record.	do	
Area III	0.45	8/22/32	Calcium chloron	Solid	300 lbs.	375 bushes	Crown application	3
Area IV							Subsurface drench	
Plots 1,2,3	0.3	8/24/32	Sodium chlorate*	1	105 gals.	No record	and aerial spray	20

*Glue 0.01 per cent used as a sticker and spreader.

10.0 euro per hour as a tax rebate.

Table No. 2.

Cost Data for Experimental Eradication of Ribes at Shawano and Keshena, Wisconsin.

Work Done in August, 1932.

		Quen. Applied (a):			Man Hours of	Cost of	Total Cost:
		Gals.	Gals.	Cost of	Labor per Acre	Labor (b)	of Chemical:
		and (or) and (or)	Chemical:	Chemical:	Foreman: Per Acre	and Labor	
		Lbs. Per: Lbs. per:	Per	Per	Crewman: (d)	Crew-: Fore-	per
		Plot : Acre	Lb.	Acre	(4)	men : men	Acre
Location	Chemical Used						
Area I							
2E. (1-4) S	Sodium chlorate	78	\$.075	\$14.63	41.3	20.6	8.26 : 16.58 : 39.47
Area I							
1E. (1-4) S	Ammonium thiocyanate	32	.075	6.00	24.4	12.2	4.88 : 9.82 : 20.70
Area III	Calcium chloron(c)	300	.07	46.62	6.7	3.3	1.34 : 2.66 : 50.71
Area IV	Sodium chlorate	105	.075	26.25	66.7	33.3	13.34 : 26.81 : 66.40

(a) Concentration of aqueous solution was one pound per gallon. Thus, figures for gallons per acre and pounds per acre are the same.

(b) Crew labor was figured at \$0.20 per hour and the foremen at \$0.91 and \$0.70 per hour. These figures for foremen include subsistence allowance.

(c) A proprietary weed killer made by the New England Lime Co., Pittsfield, Mass.

(d) Two foremen were used, but with an experienced crew one should be sufficient.

• Collected from the same place as the other two (2) •
• Collected from the same place as the other two (2) •

[illegible]

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Table No. 3.

Weather Notes at Shawano and Keshena, Wisconsin, 1932.

&					
: Date	: Soil Temper- : ature Average	: Air Temper- : ature Average	: Relative: : Humidity:	Remarks	
: 8/22/32	: 66	: 77	: 64	: Light showers in early	
:	:	:	:	: morning; afternoon lightly	
:	:	:	:	: clouded, light breeze.	
: 8/23/32	: 61	: 75	: 52	: Clear, no breeze.	
: 8/24/32	: 69	: 87	: 46	: Part clouded, storm	
:	:	:	:	: threatening.	

Tentative Observations on Merits of Chemical Work.

"The real value of these experiments will be determined next year when the plots are checked for per cent of kill obtained with the different chemicals. In the meantime cost figures as given in Table No. 2 should be regarded with a wary eye. It is certain that costs of \$39.58 and \$66.56 for sodium chlorate treatment of Wisconsin Ribes can be reduced materially. As an example of what preliminary experiments mean in terms of later work the cost of the chemical destruction of R. petiolare in north Idaho might be quoted. At Clarkia, Idaho in 1926 the eradication of R. petiolare with aqueous sodium chlorate cost \$37.87 per acre; three years later the same sort of work was done for about \$15 per acre. Certainly 16½ man hours of labor for the eradication of 2,725 feet of live stem as shown by Table No. 1 of this report can be improved upon. Furthermore the cost of chemical per 1,000 feet of live stem on the basis of data in Table No. 2 would be about \$5.37. The cost of sodium chlorate per 1,000 feet of R. petiolare live stem as it is now applied in control operations in north Idaho is approximately 15¢.

"Should the results of these experiments show that a high degree of efficiency attends the use of chemicals on Wisconsin Ribes a thoughtfully planned series of experiments should be undertaken to establish minimum dosage and technic of application. Until such a program of experimentation is complete comparisons of the cost of chemical and hand pulling methods are meaningless.

H. R. Offord
Agent

G. E. Draper
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approximately 15¢. live stem as it is now applied in control operations in north Idaho is about \$5.37. The cost of sodium chlorate per 1,000 feet of R. petiolare per 1,000 feet of live stem on the basis of data in Table No. 2 would be No. 1 of this report can be improved upon. Furthermore the cost of chemical labor for the eradication of 2,725 feet of live stem as shown by Table sort of work was done for about \$15 per acre. Certainly 16½ man hours of aqueous sodium chlorate cost \$37.87 per acre; three years later the same be quoted. At Glarkia, Idaho in 1928 the eradication of R. petiolare with the cost of the chemical destruction of R. petiolare in north Idaho might As an example of what preliminary experiments mean in terms of later work for sodium chlorate treatment of Wisconsin Ribes can be reduced materially. regarded with a wary eye. It is certain that costs of \$39.28 and \$66.56 chemicals. In the meantime cost figures as given in Table No. 2 should be when the plots are checked for per cent of kill obtained with the different "The real value of these experiments will be determined next year

Tentative Observations on Merits of Chemical Work.

8/24/32	69	87	46	Part cloudy, storm	Threatening.
8/23/32	61	75	53	Clear, no breeze.	
8/22/32	66	77	64	Light showers in early morning; afternoon lightly clouded, light breeze.	
Date	Average	Humidity	Remarks		
Soil Temp.	Air Temp.	Relative			

Weather Notes at Sawano and Kashana, Wisconsin, 1932.

Table No. 3.

INFORMATIONAL ACTIVITIES.

Because blister rust is a comparatively new disease in Wisconsin, general information on the subject, such as identification, immediate and potential damage, and the method of control, is of value to white pine owners and is being brought to their attention for this reason. Frequently blister rust control men from this office discover the disease destroying pine trees without the owner being aware of what is responsible for the damage. An attempt is being made to teach pine owners that each Ribes bush is a potential hazard to his future pine crop; that blister rust can spread to his pines through the Ribes only, and that white pines will remain healthy if Ribes are not grown within an infecting distance of them. The following means were used to carry this information to the public:

1. Radio.-Four talks were given during the year; three of these were broadcast from WLBL, Stevens Point Station, and one was broadcast from WHA, University of Wisconsin Station at Madison.

2. Magazines and Newspapers.-News articles on blister rust were released frequently by the Department during the year. In addition to these state news releases, articles of local interest were given to newspapers and farm magazines in the community in which local control work was being conducted.

3. Mimeographed Publications.-Two mimeographed articles were prepared during the year. One was written for the Conservation Department to be sent out with each shipment of white pines to those individuals who purchase trees from the State Forest Nursery. The other was prepared in cooperation with the state entomologist for distribution among the Junior Forest Rangers in Wisconsin. The latter article was sent to approximately 1,200 Junior Forest Rangers by Assistant 4-H Club Leader Mr. Wakelin McNeel of the University of Wisconsin Agricultural Extension Service.

4. State and Federal Publications.-During 1932 distribution was made to pine owners and others interested in the disease of approximately 200 copies of the Wisconsin Department of Agriculture and Markets Bulletin No. 124 entitled "Some of the More Important Insects and Plant Diseases of Wisconsin Trees and Shrubs". About 2,200 U. S. Department of Agriculture Miscellaneous Publication No. 22 called, "How Blister Rust Spreads and Destroys White Pines" were also distributed among interested persons in the state.

5. Window Displays.-It was the practice of the Department during the field season to place window displays in regions where local control work was being performed. In addition to these local displays a large display was placed in Gimbel's Store, Inc., in Milwaukee in conjunction with the Insect Pest and Plant Disease exhibit by the state entomologist's office during the Wisconsin Nurserymen's Association annual meeting in that city.

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COSTS.

In Table No. 29 there is shown the summary of all state and Federal expenditures for blister rust control in Wisconsin January 1 to December 1, 1932.

Under state expenditures are included all actual expenditures or contributed time of the various state agencies, all wages of laborers on Ribes eradication work, and the value of the owners' labor at the going rate of pay. In other words under state costs are included all expenditures not furnished by the Federal Government.

Table No. 29.

State and Federal Expenditures for all Blister Rust Control Projects, Wisconsin, Jan. 1 to Dec. 31, 1932.

: Agency	: Expendi- : ture	: Classi- : fication	: Super- : vision	: B.R.C. : Agent : Act.	: Ribes : Eradi- : cation	: Field : Data	: Nursery : San- : itation	: Misc.	: Totals
: State	: Salaries:			: \$ 910.90:	: \$5,478.24:	: \$355.00:	: \$386.64:		: \$ 7,130.78:
	: Expenses:			: 842.62:	: 600.88:	: 241.53:	: 104.50:		: 1,789.53:
	: Sub-								
	: total			: 1,753.52:	: 6,079.12:	: 596.53:	: 491.14:		: 8,920.31:
: Federal	: Salaries:			: \$ 750.00:	: 1,650.00:			: \$25.83:	: 2,425.83:
	: Expenses:			: 268.75:	: 607.55:				: 876.30:
	: Sub-								
	: total			: 1,018.75:	: 2,257.55:			: 25.83:	: 3,302.13:
: Grand Totals				: \$1,018.75:	: \$4,011.07:	: \$6,079.12:	: \$596.53:	: \$491.14:	: \$25.83:
									: \$12,222.44:

Table No. 30.

Per Cent of Total of Each Project Expenditure Spent by Each Agency, Wisconsin 1932.

: Agency	: B.R.C.	: Ribes	: Agent	: Eradi- : cation	: Field : Data	: Nursery : Sanitation	: Misc.	: Totals
: State	: 43.7	: 100.0	: 100.0	: 100.0	: 100.0	: 100.0	: 100.0	: 73.0
: Federal	: 100.0	: 56.3	: 100.0	: 100.0	: 100.0	: 100.0	: 100.0	: 27.0
: Total	: 100.0	: 100.0	: 100.0	: 100.0	: 100.0	: 100.0	: 100.0	: 100.0

In Table No. 30 the material in Table No. 29 is expressed as a per cent of each project expenditure spent by each agency. It may be observed that the Federal Government supplied the entire supervision cost and over half of the blister rust control agent activities cost. The state furnished the entire outlay on Ribes eradication, field data, nursery sanitation and over 40 per cent of the blister rust control agent activities.

In Table No. 29 there is shown the summary of all state and Federal expenditures for blaster trust control in Wisconsin January 1 to December 1, 1932.

Under state expenditures are included all actual expenditures or contributed time of the various state agencies, all wages of laborers on Ribes eradication work, and the value of the owners' labor at the going rate of pay. In other words under state costs are included all expenditures not furnished by the Federal Government.

Table No. 29.

State and Federal Expenditures for all Blaster Trust Control Projects, Wisconsin, Jan. 1 to Dec. 31, 1932.

Agency: Blaster Trust Control	Act.	Sanitation	Data	Field	Super-	Agent	Field	San-	Nursery	State	Federal	Total
Salaries	\$ 910.90	\$ 478.24	\$ 355.00	\$ 386.64						1,739.53	8,920.31	10,659.84
Expenses	842.62	800.88	241.23	104.50						1,989.23	2,422.82	4,411.05
Sub-												
Total	1,753.52	1,279.12	596.23	491.14						3,728.76	11,341.16	15,070.92
Salaries	750.00	1,250.00								1,989.23	2,422.82	4,411.05
Expenses	842.62	800.88	241.23	104.50						1,989.23	2,422.82	4,411.05
Sub-												
Total	1,592.62	2,050.88	482.46	208.50						3,978.76	4,845.64	8,824.40

Table No. 30.

Per Cent of Total of Each Project Expenditure Spent by Each Agency, Wisconsin 1932.

Agency: Blaster Trust Control	Act.	Sanitation	Data	Field	Super-	Agent	Field	San-	Nursery	State	Federal	Total
Salaries	100.0	100.0	100.0	100.0						100.0	100.0	100.0
Expenses	100.0	100.0	100.0	100.0						100.0	100.0	100.0
Sub-												
Total	100.0	100.0	100.0	100.0						100.0	100.0	100.0

In Table No. 30 the material in Table No. 29 is expressed as a per cent of each project expenditure spent by each agency. It may be observed that the Federal Government applied the entire supervision cost and over half of the blaster trust control agent activities cost. The state furnished the entire outlay on Ribes eradication, field data, nursery sanitation and over 40 per cent of the blaster trust control agent activities.

In Table No. 31 the material in Table No. 29 is expressed as a per cent of total expenditures spent on each project. It may be observed that over 68 per cent of the state expenditure was expended on Ribes eradication and that nearly 20 per cent of the state expenditure was classified as blister rust control activities.

Over 68 per cent of the Federal expenditure went to blister rust control agent activities and less than 31 per cent of it to supervision.

Of the total expenditure of all the agencies nearly half of it went directly to Ribes eradication, nearly 1/3 of it to blister rust control agent activities and only 8.4 per cent to supervision.

Table No. 31.

:	:	:B.R.C.:	Ribes :	:	:	:	:	:
:	:	:Super-:	Agent :	:Eradi-:	Field:	Nursery :	:	:
:Agency :	vision:	Act. :	cation:	Data :	Sanitation:	Misc.:	Totals:	:
:State :	:	19.7 :	68.1 :	6.7 :	5.5 :	:	100.0 :	:
:Federal:	30.8 :	68.4 :	:	:	:	:	0.8 :	100.0 :
:Total :	8.4 :	32.8 :	49.7 :	4.9 :	4.0 :	0.2 :	100.0 :	:

SUMMARY AND CONCLUSION.

In spite of reduced funds from Federal and state sources for blister rust control in Wisconsin, the year 1932 showed the largest amount of work done in protecting white pine stands against blister rust. Eighteen thousand four hundred fifty-seven acres were initially cleared of Ribes at the rate of 73 per acre and at a cost of 33¢ per acre. The acreage covered was nearly twice as large as that of any year previous to 1932. The cost per acre was decidedly the cheapest of any year since eradication started. These results are in large measure due to the effective use of the unemployed on control projects. Blister rust control constitutes an excellent work relief project because the work is not difficult for the average man to comprehend and because practically all of the expenditure is for labor. Furthermore, blister rust control is of such a nature that it will always require a great deal of hand labor rather than machine labor. It is expected that greater use will be made of the unemployed on blister rust control projects in the future. Sentiment favoring reforestation is increasing in Wisconsin. The principal nurseries growing white pine for reforestation purposes have been put in a sanitary condition with reference to blister rust and such a condition will be maintained. We have barely begun a control program in Wisconsin. The fact that blister rust has spread from one county in 1915 to at least 33 counties in 1932 shows that it will only be a question of time before the disease will infect the entire white pine-growing region of Wisconsin. Up to the present time only approximately 2 per cent of the white pine acreage has been protected against blister rust. To protect the remaining 98 per cent before a serious rust injury has occurred, is the problem confronting the owners of white pine at the present time. The use of the unemployed on blister rust

control projects will serve the dual purpose of providing work relief and affording protection to a valuable potential asset which, if not protected, must inevitably be almost entirely lost.

Further work on the project is planned for 1947. The work of 1946 was very satisfactory in that it has established the project as a permanent one and has secured the necessary funds to carry it out. The work of 1947 will be to complete the project and to secure the necessary funds to carry it out.

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CONCLUSIONS

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RECOMMENDATIONS

The work of 1947 will be to complete the project and to secure the necessary funds to carry it out. The work of 1947 will be to complete the project and to secure the necessary funds to carry it out.

control projects will serve the dual purpose of providing work relief and
affording protection to a valuable potential asset which, if not protected,
must inevitably be almost entirely lost.

The first of these projects is the construction of a dam at the mouth of the
river, which will serve to protect the area from flooding and to provide
a source of water for irrigation. The second project is the construction of
a dam at the mouth of the river, which will serve to protect the area from
flooding and to provide a source of water for irrigation.

The third project is the construction of a dam at the mouth of the river,
which will serve to protect the area from flooding and to provide a source
of water for irrigation. The fourth project is the construction of a dam
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irrigation. The tenth project is the construction of a dam at the mouth
of the river, which will serve to protect the area from flooding and to
provide a source of water for irrigation.

BLISTER RUST CONTROL, MINNESOTA, 1932

HISTORY OF THE WORK.

Blister rust control work in Minnesota started in 1917. From 1917 to 1919 efforts were concentrated in eradicating the disease from the state by the destruction of Ribes and diseased pine in the known infection areas. Late in 1919 the futility of entirely eradicating the disease was realized. From then until 1922 the limited amount of control work was confined to protection of pine areas by the local eradication of Ribes.

From 1923 to 1929 blister rust control work was limited to scouting for the rust and studying blister rust damage and Ribes regrowth by one or two men employed during the summer months.

In 1929 a permanent state leader was appointed to take charge of all blister rust control activities in the state under the authority of a blister rust control law enacted by the state legislature. Under the general plan of work the state will aid pine owners by providing trained men to supervise the eradication of Ribes but the cost of eradication work will be paid by the owners.

ORGANIZATION.

Blister rust control work in Minnesota was organized under a co-operative agreement between the Minnesota State Forest Service and the U. S. Department of Agriculture through its Division of Blister Rust Control. Under the general administrative direction of the Director of the Division of Forestry the permanent state leader has charge of all blister rust control work in the state. During 1932 his salary and an automobile were furnished him by the Federal Government. His subsistence expenses and automobile expenses were furnished by the state.

Working under the State Leader was a temporary agent making pre-eradication surveys and scouting for blister rust during the summer.

The general plan of blister rust control work in Minnesota is carried out through the 18 district rangers under whom it is planned to conduct blister rust control in their respective districts.

BLISTER RUST INFECTION.

In Table No. 32 there is shown a record of blister rust infection by counties known to be infected in 1932.

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Table No. 32

Record of Blister Rust Infection by Counties, Minnesota, 1932.

Ribes Infection: Only	Pine Infection: With or Without: Ribes Infection:	Remarks
	Chicago	Pine infection first found in 1916. Since then pine & Ribes infections have become general.
	Washington	do
	Hennepin	Infection on imported pines found and des- troyed in 1916.
	Lyon	Infection on imported pine found in 1916 and destroyed.
	Steele	Infection on imported pine found and destroyed in 1917.
	Pine	Pine infection just found in 1917. Since then pine & Ribes infection have become general.
	Ramsay	Infection on imported pines found and des- troyed in 1917.
	Martin	Infection on imported pines found and des- troyed in 1918.
Carlton		Ribes infection first found in 1919. No pine infection found.
Anoka		do
Carver		do
Wabasha		do
Rice		do
	Isanti	Pine infection first found in 1919. Pine and Ribes infection now known to be general.
	Kanabac	do
	Aitkin	Pine and Ribes infection general.
	St. Louis	<u>R. nigrum</u> infection found in Duluth in 1922. 5 infected pines found in 1925 in Hartley plantation, Duluth. Many <u>R. nigrum</u> bushes in Duluth and they were heavily infected yearly from 1925 to 1932. Several pine infection cen- ters found in vicinity of Duluth and in sur- rounding townships in 1932. <u>R. nigrum</u> infection: found at Virginia and Tower in 1932.
	Lake	Pine and <u>R. nigrum</u> infection first found in 1925 in Two Harbors. Ribes infection found 1926, 1928, 1929, 1930, 1931, 1932. Additional pine infection center found in 1932.
	Morrison	One Ribes infection found 1925. No other in- fection found until 1932 when one infected pine and one location of infected Ribes were found.
	Crow Wing	Ribes infection first found in 1920 and pine infection in 1927. Considerable scouting in 1932 disclosed the location of 11 pine infec- tions in 6 townships and 10 Ribes-only infec- tions in 4 of the above-mentioned townships and in one additional one.

Record of Blister Rust Infection by Counties, Minnesota, 1932.

Only	Ribes Infection	Remarks
Chicago	Pine Infection	Pine infection first found in 1916. Since then pine & Ribes infections have become general.
Washington	Pine Infection	do
Hennepin	Pine Infection	Infection on imported pines found and destroyed in 1916.
Lyon	Pine Infection	Infection on imported pine found in 1916 and destroyed.
Steele	Pine Infection	Infection on imported pine found and destroyed in 1917.
Pine	Pine Infection	Pine infection first found in 1917. Since then pine & Ribes infection have become general.
Hennepin	Pine Infection	Infection on imported pines found and destroyed in 1917.
Martin	Pine Infection	Infection on imported pines found and destroyed in 1918.
Carlton	Pine Infection	Ribes infection first found in 1918. No pine infection found.
Anoka	Pine Infection	do
Carver	Pine Infection	do
Wabasha	Pine Infection	do
Rice	Pine Infection	do
Isanti	Pine Infection	Pine infection first found in 1919. Pine and Ribes infection now known to be general.
Kanabec	Pine Infection	do
Aitkin	Pine Infection	Pine and Ribes infection general.
St. Louis	Pine Infection	R. nigrum infection found in Duluth in 1922. 5 infected pines found in 1925 in Hartley plantation, Duluth. Many R. nigrum bushes in Duluth and they were heavily infected yearly from 1925 to 1932. Several pine infection centers found in vicinity of Duluth and in surrounding townships in 1922. R. nigrum infection found at Virginia and Tower in 1922.
Lake	Pine Infection	Pine and R. nigrum infection first found in 1925 in Two Harbors. Ribes infection found in 1925, 1928, 1929, 1930, 1931, 1932. Additional pine infection center found in 1932.
Morrison	Pine Infection	One Ribes infection found 1925. No other infection found until 1932 when one infected pine and one location of infected Ribes were found.
Crow Wing	Pine Infection	Ribes infection first found in 1930 and pine infection in 1937. Considerable scattering in 1932 disclosed the location of 11 pine infections in 6 townships and 10 Ribes-only infections in 4 of the above-mentioned townships and in one additional one.

Table No. 32 (Continued)

:Ribes Infection:	Pine Infection:	:
: Only	:With or Without	Remarks
:	:RibesInfection:	:
:	:Mille Lacs	:Ribes infection first found in 1919 and
:	:	:Ribes and pine infection found in 1930.
:	:	:Infection general.
:	:Itasca	:Ribes infection reported in Grand Rapids
:	:	:in 1920 and 1925. One pine infection center:
:	:	:found in 1929.
:Cass	:	:Infection found on <u>R. cynosbati</u> in 1930 one:
:	:	:location.Infection on same species found
:	:	:near Cass Lake in 1931 in two locations.
:	:	:School survey 1930 showed cultivated red
:	:	:currant infection near Hovland. This same
:	:	:location (red and cultivated black currants)
:	:	:showed Ribes infection in 1932. 3 other
:	:	:infected Ribes locations found in 1932.No
:	:	:pine infection.
: 7 Counties	: 17 Counties	:

From the infection map and from Table No. 32 it is evident that blister rust is well distributed over the white pine region of Minnesota. At the end of 1932 infection either on pines or Ribes or both had been found in a total of 24 counties, 17 of which showed pine infection and 7 Ribes only infection. Blister rust was first found in Minnesota during 1916 on pine in a nursery near St. Croix.

The rust at the present time is known to be widespread and well established both on pines and Ribes in the general vicinity of Duluth and St. Louis County and in Lake County. In Crow Wing County, in a southwesterly direction from Duluth, pine infection and Ribes infection were found becoming well established over quite a large acreage of white pine. In both of these regions of Minnesota white pine stands are abundant and valuable.

WHITE PINE ACREAGE.

In Table No. 33 there are shown by counties the best estimates at the present time regarding the acreage of white pine in Minnesota. These estimates will be improved as the work progresses.

No attempt has been made in Table No. 33 to differentiate between good stands of white pine and scattered white pine. However, it is estimated by the State Leader that, conservatively, 250,000 acres of the estimated total of approximately a million acres support good stands of white pine.

A small amount of pre-eradication survey work has been done in Minnesota. In Table No. 34 the result of these surveys is shown:

From the infection map and from Table No. 32 it is evident that blister rust is well distributed over the white pine region of Minnesota. At the end of 1933 infection either on pines or larches or both had been found in a total of 24 counties, 17 of which showed pine infection and 7 larches only. Blister rust was first found in Minnesota during 1913 on pine in a nursery near St. Croix.

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white pine. estimated total of approximately a million acres support good stands of estimated by the State Lumber that, conservatively, 250,000 acres of the good stands of white pine and scattered white pine. However, it is No attempt has been made in Table No. 38 to differentiate between

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Table No. 33.

Estimated Acreage of White Pine in Minnesota.

County	Acres	White Pine	Source of Information
Aitkin	1,854		Cartographical Survey.
Becker	5,076		Minn. Land Classification 1931.
Beltrami	16,263		Cartographical Survey.
Carlton	6,137		" "
Cass	9,689		" "
Chicago	978		B.R.C. Agents Observations.
Clearwater	137,102		Minn. Land Classification and Rangers.
Cook	170,899		Cartographical Survey.
Crow Wing	19,532		B.R.C. Pine Survey 1932.
Hubbard	704		Land Economic Survey.
Isanti	358		B.R.C. Agents Observations.
Itasca	45,614		Cartographical Survey.
Kanabec	1,761		B.R.C. Agents Observations.
Koochiching	139,259		Ranger and Cartographical Survey.
Lake	64,067		Ranger and Cartographical Survey.
Lake of the Woods	2,010		Ranger R. Gilpin.
Mahnomen	3,786		Minn. Land Classification.
Mille Lacs	738		B.R.C. Pine Survey.
Morrison	1,475		B.R.C. Pine Survey and Cartographical Survey.
Pine	1,625		" " " " " "
Ramsey	97		B.R.C. Agents Observations.
St. Louis	414,390		All sources available.
Washington	316		B.R.C. Agents Observations.
	1,043,730		

In addition to this total a considerable amount of forest land will be added to the total acreage of the State in the near future. It is obvious, therefore, that in Minnesota the forest land is being rapidly depleted and that the State is losing its forest resources.

Only a very small amount of forest land is being protected in Minnesota. The only forest land which is being protected is the land which is owned by the State. The State owns a very small amount of forest land, and this land is being protected by the State. The State is not doing enough to protect its forest resources, and it is losing its forest resources rapidly.

Table No. 35.

Estimated Acreage of White Pine in Minnesota.

County	White	Pine	Source of Information
Adair	1,354	Cartographical Survey.	
Becker	5,076	Minn. Land Classification 1921.	
Belt	16,263	Cartographical Survey.	
Carlton	8,137	"	
Cass	9,689	"	
Chicago	978	B.R.C. Agents Observations.	
Cleburn	157,103	Minn. Land Classification and Ranges.	
Cook	170,899	Cartographical Survey.	
Crow Wing	19,533	B.R.C. Pine Survey 1922.	
Hubbard	704	Land Economic Survey.	
Isanti	359	B.R.C. Agents Observations.	
Itasca	45,614	Cartographical Survey.	
Kanabec	1,761	B.R.C. Agents Observations.	
Koochiching	130,259	Ranger and Cartographical Survey.	
Lake	64,067	Ranger and Cartographical Survey.	
Lake of the Woods	3,010	Ranger R. Gilpin.	
Macpherson	3,788	Minn. Land Classification.	
Mill Lake	738	B.R.C. Pine Survey.	
Morrison	1,475	B.R.C. Pine Survey and Cartographical Survey.	
Pine	1,625	"	
Ramsey	97	B.R.C. Agents Observations.	
St. Louis	414,390	All sources available.	
Washington	318	B.R.C. Agents Observations.	
	1,043,730		

Table No. 34.

Pre-Eradication Surveys, Minnesota, 1932.

County	White Pine Acres			
	Needing	Ribes Free	Total	
	Crew	(Scout Work)	Acres	
	Work		Examined	
Aitkin	203	121	324	
Becker	334	0	334	
Chicago	280	279	359	
Clearwater	211	0	211	
Crow Wing	1,912	2,240	4,152	
Isanti	74	0	74	
Kanabec	27	0	27	
Mahnomen	318	0	318	
Mille Lacs	322	187	509	
Morrison	170	232	402	
Pine	138	48	186	
St. Louis	1,177	15	1,192	
Washington	174	0	174	
Total	5,140	3,122	8,262	

A considerable portion of the white pine lands of Minnesota is under state or Federal control and more and more land will probably come under state control as a result of the tax delinquency situation. According to "Forestry in Minnesota" published by the Department of Conservation in 1929, there is a gross total of 1,904,292 acres in national forests; 1,030,190 acres in state forests and 39,036 acres in state parks; a total of 2,973,518 acres under state or federal control. In addition to this total a considerable acreage of forest land will undoubtedly come under state control on account of tax delinquency. It is obvious, therefore, that in Minnesota blister rust control must largely become state and Federal projects.

RIBES ERADICATION.

Only a relatively small amount of actual Ribes eradication work was done in 1932. The chief activities of the State Leader were in connection with laying plans for the fairly extensive local control program in the future. In Table No. 35 there is shown a record of all local control work performed in Minnesota in 1932. In Table No. 36 there is shown a statement of all Ribes eradication work done since 1918.

Pre-Eradication Surveys, Minnesota, 1932.

County	Work	Grew	Needling	White Pine Acres
Atkin	203	121	324	
Becker	334	0	334	
Chicago	280	279	339	
Clearwater	211	0	211	
Crow Wing	1,912	2,240	4,152	
Isanti	74	0	74	
Kanabec	27	0	27	
Mahnomen	218	0	218	
Mill Lake	322	187	509	
Morrison	170	322	492	
Pine	128	48	186	
St. Louis	1,177	12	1,189	
Washington	174	0	174	
Total	5,140	3,122	8,262	

A considerable portion of the white pine lands of Minnesota is under state or Federal control and more and more land will probably come under state control as a result of the tax delinquency situation. According to "Forestry in Minnesota" published by the Department of Conservation in 1929, there is a gross total of 1,204,292 acres in national forests; 1,030,190 acres in state forests and 39,026 acres in state parks; a total of 2,273,518 acres under state or Federal control. In addition to this total a considerable acreage of forest land will undoubtedly come under state control on account of tax delinquency. It is obvious, therefore, that in Minnesota disaster tax control must largely become state and Federal projects.

RIBES ERADICATION.

Only a relatively small amount of actual Ribes eradication work was done in 1932. The chief activities of the State Leader were in connection with laying plans for the fairly extensive local control program in the future. In Table No. 35 there is shown a record of all local control work performed in Minnesota in 1932. In Table No. 36 there is shown a statement of all Ribes eradication work done since 1918.

Table No. 35

Cooperative Local Control, Minnesota, 1932.

Cooperation	:No. :Acres:		:RibesPulled:		Costs		Per Acre	
	:of :Pine :Acres :	:	:Indi- :	:	:	:	:	:
	:Jobs:Prot.:Worked:	Wild :Cult.:viduals:	State :Federal:	Total	Costs	Ribes		
Initial Eradication								
:Individuals	: 2 : 54 :	74 : 2,300: 0 : 20.35 :	5.00 :	4.00:	29.35	: 0.396 :	31	
:Public Lands	: 1 : 30 :	80 : 23,275: 0 : 0 : *	108.40 :	20.00:	128.40	: 1.605 :	291	
:Total Initial Work:	3 : 84 :	154 : 25,575: 0 : 20.35 :	113.40 :	24.00:	157.75	: 1.024 :	166	
2nd Eradication								
:Individuals	: 1 : 40 :	40 : 500: 0 : 3.20 :	2.00 :	4.00:	9.20	: .230 :	12	
:Grand Totals	: 4 : 124 :	194 : 26,075: 0 : 23.55 :	115.40 :	28.00:	166.95	: .861 :	134	

*Jay Cooke Park paid for labor \$104.40 included in State Costs.

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Table No. 36.

Summary of Ribes Eradication Work by Years
Minnesota. 1918 to 1932.

Acres Worked			Ribes Pulled			Per Acre		
Year:	2nd				Total			
Initial:	Erad.	Total	Wild	Cult.	Cost	Cost	Ribes	
1918:	1200	0	1200	90,000	0	\$ 3,000.00	2.500	75
1919:	2440	0	2440	156,304	0	5,596.66	2.294	64
1920:	677	0	677	120,297	118	5,160.03	7.622	178
1921:	589	0	589	39,773	0	397.78	0.675	68
1922:	75	0	75	904	0	25.70	0.343	12
1930:	1188	278	1466	79,877	13	856.94	0.585	54
1931:	478	264	742	142,764	406	1,074.89	1.449	193
1932:	154	40	194	26,075	0	166.95	0.861	134
Tot.:	6801	582	7383	655,994	537	16,278.95	2.205	89

During the years 1918, 1919 and 1920 in addition to Ribes eradication, efforts were devoted to cutting out cankers. This necessarily increased the cost.

No Ribes eradication work was done from 1923 to 1929 inclusive.

During the past three years a very limited amount of protection work has been done. In fact, during the entire period a very negligible amount of actual protection work has been accomplished. Plans are being made, however, to perform control on a substantially larger basis.

The average cost of \$2.20 per acre for pulling an average of 89 Ribes per acre is high due to the fact that on over half of the acreage worked initially, the cost of removing cankers was included with the cost of eradication of Ribes.

The status of local control in Minnesota at the end of 1932 may be summed up as follows:

Estimated acreage of white pine	1,043,730
Estimated acreage of white pine initially protected (1918-1932)	2,270
Per cent acres of white pine initially pro- tected	0.2%

Summary of Ribes eradication work in Minnesota, 1918 to 1932.

Year:	Traded:	Total:	Wild:	Cost:	Total:	Per Acre
1918:	1200	0	1200	0	3,000.00	75
1919:	2440	0	2440	0	5,228.88	84
1920:	877	0	877	0	2,160.08	178
1921:	809	0	809	0	337.78	38
1922:	75	0	75	0	25.70	12
1923:	1188	378	1466	79,877	888.04	54
1924:	475	304	779	142,784	1,041.89	123
1925:	174	40	194	38,975	186.95	134
Total:	6001	582	7883	625,994	18,278.95	89

During the years 1918, 1919 and 1920 in addition to Ribes eradication, efforts were devoted to cutting out cankers. This necessarily increased the cost.

No Ribes eradication work was done from 1923 to 1929 inclusive.

During the past three years a very limited amount of protection work has been done. In fact, during the entire period a very negligible amount of actual protection work has been accomplished. Plans are being made, however, to perform control on a substantially larger basis.

The average cost of \$2.30 per acre for pulling an average of 82 Ribes per acre is high due to the fact that on over half of the average worked initially, the cost of removing cankers was included with the cost of eradication of Ribes.

The status of local control in Minnesota at the end of 1932 may be summed up as follows:

Estimated average of white pine	1,042,730
Estimated average of white pine initially protected (1918-1932)	3,270
Per cent acres of white pine initially protected	0.31

NURSERY SANITATION.

There are few nurseries in Minnesota outside of Federal, State and county nurseries which are producing white pine for reforestation purposes. In Table No. 37 is shown the status of nursery sanitation work in 1932.

INVESTIGATIONAL ACTIVITIES.

Experimental Chemical Eradication.

On June 31, 1932 a small chemical eradication experiment was conducted on large clumps of R. americanum at Lake Vadnais near St. Paul. Eight 1-square rod and two 2-square rod plots were established. Five of these 10 plots were treated with sodium chlorate to which glue had been added and the remaining 5 plots were treated with Atlacide. Different concentrations and different methods of application of these chemicals to the Ribes were made as shown in Table No. 38. On August 11 the plots were examined for the effect of chemical.

That R. americanum live stem was abundant on the plot is evidenced by the fact that practically 63 per cent of the ground was occupied by Ribes occurring at the rate of 250,000 feet of live stem per acre. Since sodium chlorate is an active killing agent, it was to be expected that a concentration of sodium chlorate would be more likely to kill Ribes live stem than the same concentration of Atlacide. A much better kill was obtained by using 1.6 pounds sodium chlorate per gallon than the same concentration of Atlacide. Three pounds of sodium chlorate per thousand feet of live stem resulted in 98.8 per cent apparent kill on August 11 whereas 4.4 pounds of Atlacide per thousand feet of live stem resulted in only 91.7 per cent apparent kill. A much less efficient result of weaker concentrations of each chemical was evidenced when .8 pound and .4 pound were used. In each concentration of chemical sodium chlorate showed up better than Atlacide.

Better results were also obtained with sodium chlorate when the roots were drenched with a very weak solution of each chemical. However, 4 pounds of sodium chlorate per thousand feet of live stem were applied as opposed to only 1.8 pounds of Atlacide per thousand feet of live stem.

In the case of the application of dry chemical the Atlacide showed a slightly higher per cent kill than did sodium chlorate, although a half pound more of Atlacide per thousand feet of live stem was applied.

The net result of all use of sodium chlorate in applying an average of 2.9 pounds per thousand feet of live stem was to cause 81.1 per cent apparent kill. Atlacide at the rate of 1.8 pounds per thousand feet of live stem resulted in only 56.4 per cent apparent kill. This apparent lowering in efficiency per cent of Atlacide may be due in part to the fact that only approximately 2/3 as much Atlacide was applied per equal amounts of live stem as sodium chlorate. Observations on this experiment will be continued in 1933.

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Better results were also obtained with sodium chlorate when the roots were branched with a very weak solution of each chemical. However, 4 pounds of sodium chlorate per thousand feet of live stem were applied as opposed to only 1.8 pounds of Atlatide per thousand feet of live stem.

In the case of the application of dry chemical the Atlatide showed a slightly higher per cent kill than did sodium chlorate, although a half pound more of Atlatide per thousand feet of live stem was applied.

The net result of all use of sodium chlorate in applying an average of 2.9 pounds per thousand feet of live stem was to cause 31.1 per cent apparent kill. Atlatide at the rate of 1.8 pounds per thousand feet of live stem resulted in only 26.4 per cent apparent kill. This apparent lowering in efficiency per cent of Atlatide may be due in part to the fact that only approximately 2/3 as much Atlatide was applied per equal amounts of live stem as sodium chlorate. Observations on this experiment will be continued in 1933.

Table No. 37.

Status of Nursery Sanitation. Minnesota, 1932.

Name and Location:		White Pines:		1st:		2nd:		3rd:		4th:		5th:		6th:		7th:		8th:		9th:		10th:		11th:		12th:		13th:		14th:		15th:		16th:		17th:		18th:		19th:		20th:		21st:		22nd:		23rd:		24th:		25th:		26th:		27th:		28th:		29th:		30th:		31st:		32nd:		33rd:		34th:		35th:		36th:		37th:		38th:		39th:		40th:		41st:		42nd:		43rd:		44th:		45th:		46th:		47th:		48th:		49th:		50th:		51st:		52nd:		53rd:		54th:		55th:		56th:		57th:		58th:		59th:		60th:		61st:		62nd:		63rd:		64th:		65th:		66th:		67th:		68th:		69th:		70th:		71st:		72nd:		73rd:		74th:		75th:		76th:		77th:		78th:		79th:		80th:		81st:		82nd:		83rd:		84th:		85th:		86th:		87th:		88th:		89th:		90th:		91st:		92nd:		93rd:		94th:		95th:		96th:		97th:		98th:		99th:		100th:		101st:		102nd:		103rd:		104th:		105th:		106th:		107th:		108th:		109th:		110th:		111st:		112nd:		113rd:		114th:		115th:		116th:		117th:		118th:		119th:		120th:		121st:		122nd:		123rd:		124th:		125th:		126th:		127th:		128th:		129th:		130th:		131st:		132nd:		133rd:		134th:		135th:		136th:		137th:		138th:		139th:		140th:		141st:		142nd:		143rd:		144th:		145th:		146th:		147th:		148th:		149th:		150th:		151st:		152nd:		153rd:		154th:		155th:		156th:		157th:		158th:		159th:		160th:		161st:		162nd:		163rd:		164th:		165th:		166th:		167th:		168th:		169th:		170th:		171st:		172nd:		173rd:		174th:		175th:		176th:		177th:		178th:		179th:		180th:		181st:		182nd:		183rd:		184th:		185th:		186th:		187th:		188th:		189th:		190th:		191st:		192nd:		193rd:		194th:		195th:		196th:		197th:		198th:		199th:		200th:		201st:		202nd:		203rd:		204th:		205th:		206th:		207th:		208th:		209th:		210th:		211st:		212nd:		213rd:		214th:		215th:		216th:		217th:		218th:		219th:		220th:		221st:		222nd:		223rd:		224th:		225th:		226th:		227th:		228th:		229th:		230th:		231st:		232nd:		233rd:		234th:		235th:		236th:		237th:		238th:		239th:		240th:		241st:		242nd:		243rd:		244th:		245th:		246th:		247th:		248th:		249th:		250th:		251st:		252nd:		253rd:		254th:		255th:		256th:		257th:		258th:		259th:		260th:		261st:		262nd:		263rd:		264th:		265th:		266th:		267th:		268th:		269th:		270th:		271st:		272nd:		273rd:		274th:		275th:		276th:		277th:		278th:		279th:		280th:		281st:		282nd:		283rd:		284th:		285th:		286th:		287th:		288th:		289th:		290th:		291st:		292nd:		293rd:		294th:		295th:		296th:		297th:		298th:		299th:		300th:		301st:		302nd:		303rd:		304th:		305th:		306th:		307th:		308th:		309th:		310th:		311st:		312nd:		313rd:		314th:		315th:		316th:		317th:		318th:		319th:		320th:		321st:		322nd:		323rd:		324th:		325th:		326th:		327th:		328th:		329th:		330th:		331st:		332nd:		333rd:		334th:		335th:		336th:		337th:		338th:		339th:		340th:		341st:		342nd:		343rd:		344th:		345th:		346th:		347th:		348th:		349th:		350th:		351st:		352nd:		353rd:		354th:		355th:		356th:		357th:		358th:		359th:		360th:		361st:		362nd:		363rd:		364th:		365th:		366th:		367th:		368th:		369th:		370th:		371st:		372nd:		373rd:		374th:		375th:		376th:		377th:		378th:		379th:		380th:		381st:		382nd:		383rd:		384th:		385th:		386th:		387th:		388th:		389th:		390th:		391st:		392nd:		393rd:		394th:		395th:		396th:		397th:		398th:		399th:		400th:		401st:		402nd:		403rd:		404th:		405th:		406th:		407th:		408th:		409th:		410th:		411st:		412nd:		413rd:		414th:		415th:		416th:		417th:		418th:		419th:		420th:		421st:		422nd:		423rd:		424th:		425th:		426th:		427th:		428th:		429th:		430th:		431st:		432nd:		433rd:		434th:		435th:		436th:		437th:		438th:		439th:		440th:		441st:		442nd:		443rd:		444th:		445th:		446th:		447th:		448th:		449th:		450th:		451st:		452nd:		453rd:		454th:		455th:		456th:		457th:		458th:		459th:		460th:		461st:		462nd:		463rd:		464th:		465th:		466th:		467th:		468th:		469th:		470th:		471st:		472nd:		473rd:		474th:		475th:		476th:		477th:		478th:		479th:		480th:		481st:		482nd:		483rd:		484th:		485th:		486th:		487th:		488th:		489th:		490th:		491st:		492nd:		493rd:		494th:		495th:		496th:		497th:		498th:		499th:		500th:		501st:		502nd:		503rd:		504th:		505th:		506th:		507th:		508th:		509th:		510th:		511st:		512nd:		513rd:		514th:		515th:		516th:		517th:		518th:		519th:		520th:		521st:		522nd:		523rd:		524th:		525th:		526th:		527th:		528th:		529th:		530th:		531st:		532nd:		533rd:		534th:		535th:		536th:		537th:		538th:		539th:		540th:		541st:		542nd:		543rd:		544th:		545th:		546th:		547th:		548th:		549th:		550th:		551st:		552nd:		553rd:		554th:		555th:		556th:		557th:		558th:		559th:		560th:		561st:		562nd:		563rd:		564th:		565th:		566th:		567th:		568th:		569th:		570th:		571st:		572nd:		573rd:		574th:		575th:		576th:		577th:		578th:		579th:		580th:		581st:		582nd:		583rd:		584th:		585th:		586th:		587th:		588th:		589th:		590th:		591st:		592nd:		593rd:		594th:		595th:		596th:		597th:		598th:		599th:		600th:		601st:		602nd:		603rd:		604th:		605th:		606th:		607th:		608th:		609th:		610th:		611st:		612nd:		613rd:		614th:		615th:		616th:		617th:		618th:		619th:		620th:		621st:		622nd:		623rd:		624th:		625th:		626th:		627th:		628th:		629th:		630th:		631st:		632nd:		633rd:		634th:		635th:		636th:		637th:		638th:		639th:		640th:		641st:		642nd:		643rd:		644th:		645th:		646th:		647th:		648th:		649th:		650th:		651st:		652nd:		653rd:		654th:		655th:		656th:		657th:		658th:		659th:		660th:		661st:		662nd:		663rd:		664th:		665th:		666th:		667th:		668th:		669th:		670th:		671st:		672nd:		673rd:		674th:		675th:		676th:		677th:		678th:		679th:		680th:		681st:		682nd:		683rd:		684th:		685th:		686th:		687th:		688th:		689th:		690th:		691st:		692nd:		693rd:		694th:		695th:		696th:		697th:		698th:		699th:		700th:		701st:		702nd:		703rd:		704th:		705th:		706th:		707th:		708th:		709th:		710th:		711st:		712nd:		713rd:		714th:		715th:		716th:		717th:		718th:		719th:		720th:		721st:		722nd:		723rd:		724th:		725th:		726th:		727th:		728th:		729th:		730th:		731st:		732nd:		733rd:		734th:		735th:		736th:		737th:		738th:		739th:		740th:		741st:		742nd:		743rd:		744th:		745th:		746th:		747th:		748th:		749th:		750th:		751st:		752nd:		753rd:		754th:		755th:		756th:		757th:		758th:		759th:		760th:		761st:		762nd:		763rd:		764th:		765th:		766th:		767th:		768th:		769th:		770th:		771st:		772nd:		773rd:		774th:		775th:		776th:		777th:		778th:		779th:		780th:		781st:		782nd:		783rd:		784th:		785th:		786th:		787th:		788th:		789th:		790th:		791st:		792nd:		793rd:		794th:		795th:		796th:		797th:		798th:		799th:		800th:		801st:		802nd:		803rd:		804th:		805th:		806th:		807th:		808th:		809th:		810th:		811st:		812nd:		813rd:		814th:		815th:		816th:		817th:		818th:		819th:		820th:		821st:		822nd:		823rd:		824th:		825th:		826th:		827th:		828th:		829th:		830th:		831st:		832nd:		833rd:		834th:		835th:		836th:		837th:		838th:		839th:		840th:		841st:		842nd:		843rd:		844th:		845th:		846th:		847th:		848th:		849th:		850th:		851st:		852nd:		853rd:		854th:		855th:		856th:		857th:		858th:		859th:		860th:		861st:		862nd:		863rd:		864th:		865th:		866th:		867th:		868th:		869th:		870th:		871st:		872nd:		873rd:		874th:		875th:		876th:		877th:		878th:		879th:		880th:		881st:		882nd:		883rd:		884th:		885th:		886th:		887th:		888th:		889th:		890th:		891st:		892nd:		893rd:		894th:		895th:		896th:		897th:		898th:		899th:		900th:		901st:		902nd:		903rd:		904th:		905th:		906th:		907th:		908th:		909th:		910th:		911st:		912nd:		913rd:		914th:		915th:		916th:		917th:		918th:		919th:		920th:		921st:		922nd:		923rd:		924th:		925th:		926th:		927th:		928th:		929th:		930th:		931st:		932nd:		933rd:		934th:		935th:		936th:		937th:		938th:		939th:		940th:		941st:		942nd:		943rd:		944th:		945th:		946th:		947th:		948th:		949th:		950th:		951st:		952nd:		953rd:		954th:		955th:		956th:		957th:		958th:		959th:		960th:		961st:		962nd:		963rd:		964th:		965th:		966th:		967th:		968th:		969th:		970th:		971st:		972nd:		973rd:		974th:		975th:		976th:		977th:		978th:		979th:		980th:		981st:		982nd:		983rd:		984th:		985th:		986th:		987th:		988th:		989th:		990th:		991st:		992nd:		993rd:		994th:		995th:		996th:		997th:		998th:		999th:		1000th:		1001st:		1002nd:		1003rd:		1004th:		1005th:		1006th:		1007th:		1008th:		1009th:		1010th:		1011st:		1012nd:		1013rd:		1014th:		1015th:		1016th:		1017th:		1018th:		1019th:		1020th:		1021st:		1022nd:		1023rd:		1024th:		1025th:		1026th:		1027th:		1028th:		1029th:		1030th:		1031st:		1032nd:		1033rd:		1034th:		1035th:		1036th	
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[illegible]

Table No. 38.

Experimental Chemical Eradication of *Ribes americanum*, Lake Vadnais,
St. Paul, Minn. 1932.

	: Size :	: Lbs. :			: Ribes Before :	: Ribes :	% ap-	: Lbs. Chem. :		
: Plot :	: of :	: Chemical :	: Chem. :	: Treatment :	: Appli- :	: Erad. 6/21/32 :	: FLS af :	: parent :	: per 1000 :	
	: Plot :	: Used :	: per :		: cation :	: Area oc- :	: ter end :	: Kill :	: FLS :	
	: Sq. Rds :		: Gal. :			: (Sq. Ft.) :	: FLS :	: 8/11/32 :	: 8/11/32 :	
I-A	: 1 :	: NaClO ₃ :	: 1.6 :	: Knapsack Spray :	: 1½ gal :	: 80 :	: 800 :	: 10 :	: 98.8 :	: 3.0 :
II-A	: 1 :	: " :	: .8 :	: " :	: 2 " :	: 150 :	: 1300 :	: 650 :	: 50.0 :	: 1.2 :
III-A	: 1 :	: " :	: .4 :	: " :	: 4 " :	: 150 :	: 1100 :	: 720 :	: 34.5 :	: 1.5 :
IV-A-B	: 2 :	: " :	: .2 :	: Roots Drenched :	: 80 gal :	: 465 :	: 4000 :	: 50 :	: 98.8 :	: 4.0 :
VI-A	: 1 :	: " :	: Dry :	: Dry :	: 2 lbs. :	: 90 :	: 900 :	: 100 :	: 88.9 :	: 2.2 :
Total	: 6 :	: " :	: :		: 23.6 lbs :	: 935 :	: 8100 :	: 1530 :	: 81.1 :	: 2.9 :
I-B	: 1 :	: Atlacide :	: 1.6 :	: Knapsack Spray :	: 2½ gal :	: 85 :	: 900 :	: 75 :	: 91.7 :	: 4.4 :
II-B	: 1 :	: " :	: .8 :	: " :	: 2 " :	: 215 :	: 1700 :	: 1360 :	: 20.0 :	: 0.9 :
III-B	: 1 :	: " :	: .4 :	: " :	: 5 " :	: 200 :	: 2200 :	: 1980 :	: 10.0 :	: 1.0 :
V-A-B	: 2 :	: " :	: .2 :	: Roots Drenched :	: 40 gal :	: 450 :	: 4400 :	: 1100 :	: 75.0 :	: 1.8 :
VI-B	: 1 :	: " :	: Dry :	: Dry :	: 4 lbs. :	: 160 :	: 1500 :	: 150 :	: 90.0 :	: 2.7 :
Total	: 16 :	: :	: :		: 19.6 lbs :	: 1110 :	: 10700 :	: 4665 :	: 56.4 :	: 1.8 :
Gr. Tot.	: 12 :	: :	: :		: 43.2 lbs :	: 2045 :	: 18000 :	: 6195 :	: 67.0 :	: 2.3 :

Approximately .63% of ground occupied by *Ribes* occurring at rate of approximately 250,000 F.L.S. per acre.

[illegible]

0,000 T.L.S. per acre.
approximately 88% of ground occupied by ridges occurring at rate of approximately 1000 ft. per acre.

INFORMATIONAL ACTIVITIES.

Informational activities for 1932 are as follows:

News and feature stories were placed in Duluth, St. Paul and Minneapolis newspapers. No record is available as to the number of articles. Three articles were published in "Fins, Feathers and Fur". Six articles were published in the "Smoke Screen", two of which dealt with blister rust. Seven blister rust window displays were placed in the following cities: Aurora, Ely, Cass Lake, Two Harbors, Brainerd, Duluth and West Duluth. Large roadside demonstration signs were placed in Interstate, Scenic and Jay Cooke State Parks. Smaller roadside demonstration signs were placed at the Cloquet Valley, Cloquet Forest Experiment Station, Cotton and Ahrens Hill Towers and in the Rainbow Inn, Park Rapids. All of the above locations are visited by a considerable number of people. These roadside demonstration signs are made up of several panels outlining briefly the organization of blister rust and the methods of blister rust control. A blister rust demonstration formed a part of the Division of Forestry state fair exhibit. County fair exhibits by the blister rust control personnel were discontinued this year. It is believed that window displays secure equal results with a smaller expenditure of time.

The Duluth Damage Demonstration was improved by replacing the cardboard signs on the area with wooden signs, securely erected. A large number of people have visited this area. The educational value of this demonstration area is steadily increasing with the increase of amount of blister rust damage. Very little infection has originated since the eradication of the wild Ribes in the vicinity of the plantation in 1930. It is planned to plant young pine in the openings in the plantation in 1933, to furnish the basis for control demonstration in addition to the damage demonstration.

Ninety-three motion picture showings, lantern slide lectures and talks were given. The motion pictures used and the talks given were not confined to blister rust control but covered in a general manner many phases of forestry work, including forest uses, management and protection.

One field demonstration sponsored by the Minnesota Arrowhead Association was attended by 8 people who were leaders of the Duluth Garden and Flower Society and Duluth Chapter of the Isaac Walton League.

COSTS.

In Table No. 39 there is given a summary of all state and Federal expenditures of blister rust control during the calendar year 1932.

In Tables No. 40 and 41 the cost figures in Table No. 39 have been expressed as percentages.

INFORMATIONAL ACTIVITIES.

Informational activities for 1932 are as follows:

News and feature stories were placed in Duluth, St. Paul and Minneapolis newspapers. No record is available as to the number of articles. Three articles were published in "Time, Leathers and Fur". Six articles were published in the "Smoke Screen", two of which dealt with blister rust. Seven blister rust window displays were placed in the following cities: Aurora, Lily, Cass Lake, Two Harbors, Brainerd, Duluth and West Duluth. Large roadside demonstration signs were placed in Interstate, scenic and Jay Cooke State Parks. Smaller roadside demonstration signs were placed at the Cloquet Valley, Cloquet Forest Experiment Station, Cotton and Throna Hill towers and in the Rainbow Inn, Park Rapids. All of the above locations are visited by a considerable number of people. These roadside demonstration signs are made up of several panels outlining briefly the organization of blister rust and the methods of blister rust control. A blister rust demonstration formed a part of the Division of Forestry state fair exhibit. County fair exhibits by the blister rust control personnel were discontinued this year. It is believed that window displays secure equal results with a smaller expenditure of time.

The Duluth Damage Demonstration was improved by replacing the cardboard signs on the area with wooden signs, securely erected. A large number of people have visited this area. The educational value of this demonstration area is steadily increasing with the increase of amount of blister rust damage. Very little infection has originated since the eradication of the wild pines in the vicinity of the plantation in 1930. It is planned to plant young pine in the openings in the plantation in 1932, to furnish the basis for control demonstration in addition to the damage demonstration.

Ninety-three motion picture showings, lantern slide lectures and talks were given. The motion pictures used and the talks given were not confined to blister rust control but covered in a general manner many phases of forestry work, including forest uses, management and protection.

One field demonstration sponsored by the Minnesota Arrowhead Association was attended by 8 people who were leaders of the Duluth Garden and Flower Society and Duluth Chapter of the Isaac Walton League.

COSTS.

In Table No. 39 there is given a summary of all state and Federal expenditures of blister rust control during the calendar year 1932.

In Tables No. 40 and 41 the cost figures in Table No. 39 have been expressed as percentages.

Table No. 39.

State and Federal Expenditures for all Blister Rust Control
Projects. Minnesota. Jan. 1 to Dec. 31, 1932.

:	:Expendi-	: Super-	: B.R.C.:	: Ribes	: B.C.	:	:Nursery:	:	:
:	: ture	: vi-	: Agent	:Eradica-	:Eradica-	:	: Field	:Sanita-	:
:Agency	: Class.	: sion	: Acct.	: tion	: tion	:	: Data	: tion	:Misc.:Totals:
:	:Salaries:	489.25	: 49.00:	132.95	: 5.00	:	: 35.00	: 121.35:	- : 832.55
:	:Expenses:	19.00	: 407.79:	6.00	: -	:	:286.50	:* 68.00:	- : 787.29
:State	:Total	: 508.25	: 456.79:	138.95	: 5.00	:	:321.50	: 189.35:	- :1619.84
:	:Salaries:	367.65	:1250.10:	28.00	: 3.50	:	:549.34	: 71.00:	- :2269.59
:	:Expenses:	9.78	: 29.33:	:	:	:	:	:34.85:	73.96
:Federal:	:Total	: 377.43	:1279.43:	28.00	: 3.50	:	:549.34	: 71.00:	34.85:2343.55
:Grand Total	:	: 885.68	:1736.22:	166.95	: 8.50	:	:870.84	: 260.35:	34.85:3963.39

*Includes \$50.00 value of nursery stock to replace pulled cultivated Ribes in nursery sanitation zone at Cass Lake Forest Service Nursery.

Table No. 40

Per Cent of Total of Each Project Expenditure Spent by Each Agency.
Minnesota, 1932.

: Agency	: Super- : vi- : sion	: B.R.C.: : Agent : Act.	: Ribes : Eradica- : tion	: B.C. : Eradica- : tion	: Field : Data	: Nursery: : Sanita- : tion	: Misc.	: Total:
: State	: 57.4	: 26.3	: 83.2	: 58.8	: 36.9	: 72.7	: 40.9	
: Federal	: 42.6	: 73.7	: 16.8	: 41.2	: 63.1	: 27.3	: 100.0	: 59.1
: Total	: 100.0	: 100.0	: 100.0	: 100.0	: 100.0	: 100.0	: 100.0	: 100.0

Table No. 41

Per Cent of Total of Expenditures of Each Agency Spent on
Each Project. Minnesota - 1932.

: Agency	: Super- : vi- : sion	: B.R.C.: : Agent : Act.	: Ribes : Eradica- : tion	: B.C. : Eradica- : tion	: Field : Data	: Nursery: : Sanita- : tion	: Misc.	: Total:
: State	: 31.4	: 28.2	: 8.6	: 0.3	: 19.8	: 11.7	: -	: 100.0
: Federal	: 16.1	: 54.6	: 1.2	: 0.2	: 23.4	: 3.0	: 1.5	: 100.0
: Total	: 22.3	: 43.8	: 4.2	: 0.2	: 22.0	: 6.6	: 0.9	: 100.0

Project. Minnesota. Jan. 1 to Dec. 31, 1982.

[illegible]

Apple No. 40

Minnesota, 1982.

[illegible]

14. Old ST

Per Cent of Total of Expenditures of Each Agency, 1952-53

Station	Lat.	Long.	Alt.	Temp.	Wind	Clouds	Remarks
1	32.3	43.8	4.2	0.2	22.0	8.5	0.0
2	32.3	43.8	4.2	0.2	22.0	8.5	0.0
3	32.3	43.8	4.2	0.2	22.0	8.5	0.0
4	32.3	43.8	4.2	0.2	22.0	8.5	0.0
5	32.3	43.8	4.2	0.2	22.0	8.5	0.0
6	32.3	43.8	4.2	0.2	22.0	8.5	0.0
7	32.3	43.8	4.2	0.2	22.0	8.5	0.0
8	32.3	43.8	4.2	0.2	22.0	8.5	0.0
9	32.3	43.8	4.2	0.2	22.0	8.5	0.0
10	32.3	43.8	4.2	0.2	22.0	8.5	0.0

SUMMARY AND CONCLUSION.

Although to date only a negligible amount of actual protection has been afforded the white pine in Minnesota, plans are made and it is expected that local control will be taken hold of as a protection measure by the State and Federal forest agencies. Due to the large amount of white pine acreage under public control and the constantly increasing amount due to tax delinquency, the local control problem is largely one of state and Federal concern. It is expected that blister rust control in Minnesota will make use of unemployment funds to put men to work on a worth while project, the expenditures of which go almost entirely to labor. This is the source of 1911 on I. Black & Son, Winbury, Long Island. The diseased white pine was sent to the Division of Forest and Game Control by Mr. Henry Hicks in 1911.

In cooperation with Mr. J. H. Shaw, Chief Bureau of Inspection of Quarantine, Federal Agents made 120 inspections of white pine in 1912. Special attention was paid to inspection along around Minneapolis and St. Paul. Infected plants had been found in 1912 and 1913. One infected plant was found in 1914 at the same place and St. Paul. Infected plants from the same source of plant imported from France in which infected plants were found in 1910 and 1911. The remaining plant which was destroyed in 1912.

In 1917, 120 inspections were made in 1917. Two white pine plants were found infected at a nursery near Capetown. One is found in 1917. There were in a lot of 3,000 plants imported from a Minnesota nursery in 1913. All remaining white pine (all of this lot) were destroyed in 1917.

In 1918, 120 inspections were made by four Federal Agents employed by the Bureau of Quarantine. They examined approximately 400 inspections of plants in 1918 in approximately 100 cases. No infection was found. In addition to inspecting, a list was compiled from nursery records showing the white pine acreage of white pine from the Federal Bureau of Quarantine and the Bureau of Forest Service of Michigan.

Inspection was continued in 1919 over the State with major emphasis being placed on the northern portion. Some Federal Agents have and approximately 200 inspections of plants in 1919 in approximately 100 cases. No infection was found.

In 1920 the Federal Agents made approximately 100 inspections of plants in the State. No infection was found.

No further inspection was done until 1921 when Mr. Shaw and Mr. Shaw made a tour of inspection through the northern portion of the State. They paid particular attention to cultivated plant material and white pine. They made 25 inspections of plants and found infected plants at five of these locations. These are: 1. St. Paul and 2. St. Paul. These are located near the northern boundary of the State and one is in the northern portion.

SUMMARY AND CONCLUSION.

Although to date only a negligible amount of actual protection has been afforded the white pine in Minnesota, plans are made and it is expected that local control will be taken hold of as a protection measure by the State and Federal forest agencies. Due to the large amount of white pine acreage under public control and the constantly increasing amount due to tax delinquency, the local control problem is largely one of state and Federal concern. It is expected that disaster relief control in Minnesota will make use of unemployment funds to put men to work on a north white project, the expenditures of which go almost entirely to labor.

BLISTER RUST CONTROL - OHIO 1932.

HISTORY OF WORK.

Prior to 1916 the rust had been found at two nurseries; the R. Hess Nursery at Akron on white pine imported from E. T. Dickinson, Chatenay, France by Mr. E. W. Evans in 1910; and the Storrs and Harrison Nursery, Painesville, on imported white pine from France by Mr. Evans in 1910 and 1911. 10,000 trees had been imported from France in 1909 for the Storrs and Harrison Nursery.

Diseased white pine had been shipped from the J. Jenkins Nursery of Winona, Ohio in the spring of 1911 to I. Hicks & Son, Westbury, Long Island, N.Y. The diseased white pine were sent to the Division of Blister Rust Control by Mr. Henry Hicks in 1911.

In cooperation with Mr. N. E. Shaw, Chief Nursery Inspector of Ohio, Federal Agents made 173 inspections of white pine in 89 towns. Special attention was paid to inspecting pines around Painesville and Akron where infected pines had been found in 1910 and 1911. One infected pine was found in 1916 at the Storrs and Harrison Nursery, Painesville from the same stock of pines imported from France in which infected pines were found in 1910 and 1911. The remaining pine stock was destroyed in 1916.

In 1917, 410 inspections were made in 133 different towns. Two white pines were found infected at a nursery near Cuyahoga Falls in Summit County. These were in a lot of 1,000 pines imported from a Minnesota nursery in 1915. All remaining white pine (662 of this lot) were destroyed in 1917.

In 1918 scouting work was continued by four Federal agents employed for various periods of time. They examined approximately 600 locations of pines or Ribes in approximately 200 towns. No infection was found. In addition to scouting, a list was compiled from nursery records showing the sales and shipments of white pine from the Kohanke Nursery at Painesville and the Wagner Parks Nurseries at Sidney.

Scouting was continued in 1919 over the State with major emphasis again being placed on the northern portion. Four Federal agents inspected approximately 650 locations of pines or Ribes in approximately 200 towns. No infection was found.

In 1920 one Federal agent spent approximately a month scouting for rust in the most likely places, chiefly in the northern part of the State. No infection was found.

No further scouting was done until 1931 when Sheals and Pierce made a short scouting trip through the northern portion of the State. They paid particular attention to cultivated black currants and wild Ribes. They made 39 inspections of Ribes and found blister rust at five of these points, three on R. nigrum and 2 on R. cynosbati. Four of these locations were in the extreme northeastern corner of the State and one was in the northwestern corner.

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Diseased white pine had been shipped from the J. Jenkins Nursery of Winona, Ohio in the spring of 1911 to I. Hicks & Son, Westbury, Long Island, N.Y. The diseased white pine were sent to the Division of Blister Rust Control by Mr. Henry Hicks in 1911.

In cooperation with Mr. W. H. Shaw, Chief Nursery Inspector of Ohio, Federal Agents made 175 inspections of white pine in 89 towns. Special attention was paid to inspecting pines around Painesville and Akron where infected pines had been found in 1910 and 1911. One infected pine was found in 1912 at the Storrs and Harrison Nursery, Painesville from the same stock of pines imported from France in which infected pines were found in 1910 and 1911. The remaining pine stock was destroyed in 1912.

In 1917, 410 inspections were made in 133 different towns. Two white pines were found infected at a nursery near Cuyahoga Falls in Summit County. These were in a lot of 1,000 pines imported from a Minnesota nursery in 1915. All remaining white pine (562 of this lot) were destroyed in 1917.

In 1918 scouting work was continued by four Federal agents employed for various periods of time. They examined approximately 600 locations of pines or larches in approximately 200 towns. No infection was found. In addition to scouting, a list was compiled from nursery records showing the sales and shipments of white pine from the Kohank Nursery at Painesville and the Wagner Parks Nurseries at Sidney.

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In 1932 during a two day trip through Ohio chiefly for the purpose of interviewing officials regarding blister rust control work, Putnam examined pines and Ribes in the Arboretum at Wooster and on the Clear Fork State Park near Loudersville. No infection was found.

STATUS OF THE RUST.

In Table No. 42 there is shown a list of all infections found or traced to Ohio.

Table No. 42.

List of Blister Rust Locations Found or Originating in Ohio 1910 to 1932.

:Location	: County	: Host	: Year	: Remarks	:
:	:	: Infected	: Found:	:	:
:R.Hess Nursery Summit	:	:White Pines:	1910	:Pines imported from Chatenay,Fr.	:
: Akron	:	:	:	:	:
:Storrs & Har-	: Lake	:White Pines:	1910	:10,000 pines imported from Or-	:
: rison Nursery	:	:	: 1911	:leans, Fr. in 1909. Infected pine:	:
: Painesville	:	:	: 1916	:in 1916 was from same lot as those:	:
:	:	:	:	:found infected in 1910 & 1911.No	:
:	:	:	:	:Ribes infection seen.Remainder of:	:
:	:	:	:	:pine lot destroyed Dec. 1916	:
:J.Jenkins	: Columbiana:	:White Pines:	1911	:Diseased pines shipped from Jen-	:
:Nursery	:	:	:	:kins Nursery in 1911 to I.Hicks &	:
:	:	:	:	:Son,L.I.,N.Y. Infection dis-	:
:	:	:	:	:covered at destination.	:
:Nursery Near	: Summit	:2 small	: 1917	:1,000W.P.imported from a Minn.	:
:CuyahogaFalls:	:	:White Pines:	:	:nursery in 1915.All remaining WP	:
:	:	:	:	: (662) of this lot were destroyed	:
:	:	:	:	:in 1917.No Ribes infection found..	:
:1 Mi. W. of	: Ashtabula:	:1 <u>R.cynos-</u>	:8/5/31	:Found by Sheals and Pierce ure-	:
:Williamsfield:	:	: <u>bati</u> heavily:	:	:dinial stage. Many other <u>R. cynos</u>	:
:along road	:	:infected.	:	:bati examined. No infection.	:
:Mr. Kelly	: Ashtabula:	: <u>R.nigrum</u>	:8/5/31	:These two places found by Sheals	:
:Monroe Center:	:	:1 bush	:	:and Pierce are about one-half	:
:J.C.Anderson	: Ashtabula:	: <u>R.nigrum</u>	:8/5/31	:mile apart. Many <u>R. cynosbati</u>	:
:Monroe Center:	:	:several	:	:examined. None found infected.	:
:	:	:bushes	:	:	:
:2 Mi.E. of	: Fulton	: <u>R.cynosbati</u>	:8/6/31	:Found by Sheals and Pierce. Num-	:
:Fayette	:	:1 bush	:	:erous <u>R.cynosbati</u> examined. One	:
:	:	:	:	:found infected.	:
:4 Mi.W.of	: Geauga	: <u>R.nigrum</u>	:8/28/31	:Found by Sheals.	:
:Harts Grove.	:	:	:	:	:
:3 Mi.E.of	:	:	:	:	:
:Montville.	:	:	:	:	:

In 1932 during a two day trip through Ohio chiefly for the purpose of interviewing officials regarding blister rust control work, Putnam examined pines and Ribes in the Arboretum at Wooster and on the Clear Fork State Park near Loudersville. No infection was found.

STATUS OF THE RUST.

In Table No. 42 there is shown a list of all infections found or traced to Ohio.

Table No. 42.

List of Blister Rust Locations Found or Originating in Ohio 1910 to 1932.

Location	County	Host	Year	Remarks
R. Hess Nursery Summit	White Pine	1910	Pines imported from Chatham, N.Y.	
Storts & Hart Lake	White Pine	1910	10,000 pines imported from Oregon	
Rison Nursery		1911	Leaves, N.Y. in 1909. Infected pine	
Painesville		1916	in 1916 was from same lot as those	
			found infected in 1910 & 1911.	
			Ribes infection seen. Remainder of	
			pine lot destroyed Dec. 1916.	
T. Jenkins Nursery	Columbus	White Pine	1911	Disseminated pines shipped from Jenkins Nursery in 1911 to I. Hicks & Son, L.I., N.Y. Infection discovered at destination.
Nursery near Summit	Summit	2 small	1917	1,000 P. imported from a Minn. nursery in 1915. All remaining (662) of this lot were destroyed in 1917. No Ribes infection found.
W. Williamsfield	Ashtabula	R. cynos-	8/5/31	Found by Sheela and Pierce near
Long road		infected.		partial stage. Many other R. cynos-
Mr. Kelly	Ashtabula	R. nigrum	8/5/31	These two places found by Sheela
Monroe Center		1 bush		and there are about one-half
J. C. Anderson	Ashtabula	R. nigrum	8/5/31	mile apart. Many R. cynosbati
Monroe Center		several		examined. None found infected.
		bushes		
E. J. J. of	Wilton	R. cynosbati	8/5/31	Found by Sheela and Pierce. One
Yvette		1 bush		found infected.
A. J. W. of	Cuyahoga	R. nigrum	8/5/31	Found by Sheela
Parts Cove.				
E. J. J. of				
Monville.				

With the exception of one R. cynosbati bush found infected in the northwestern corner of the State all of the known blister rust infections occur in the northeastern portion.

The finding of five separate Ribes infections during a short scouting trip in 1931 is probably significant of the presence of undiscovered pine infection in the general vicinities of the infected Ribes. Further scouting in these vicinities would undoubtedly disclose such pine infections.

WHITE PINE ACREAGE.

"Ohio has three areas of white pine. White pine, however, does not exist in pure stands excepting the plantations that have been established by artificial means.

"We have what is known as the Little Beaver area, Columbiana County; the Walhonding area in Ashland and Knox Counties and the Little Mountain area in Lake County. These are all native stands but the trees are scattering with the exception of the Walhonding district and the Little Mountain district which contain considerable percentages of white pine." (From a letter dated April 18, 1932 from Edmund Secrest, State Forester to Pierce.)

In Table No. 43 is shown the estimated acreage of white pine in Ohio.

Table No. 43.

Acres of White Pine in Ohio, 1932.
(From Edmund Secrest, State Forester, 1932.)

: Ownership	: Planted	: Native	: Total	:
:	: Pine	: Pine	:	:
:Federal	: 1	: -	: 1	:
:State	: 231	: 800	: 1,031	:
:Municipal or	:	:	:	:
: County	: 159	: -	: 159	:
:Private	: 748	: 52,961	: 53,709	:
: Totals	: 1,139	: 53,761	: 54,900	:

In Table No. 44 is shown the number of white pine plantations and the number of white pines planted with trees supplied from the State Nurseries from 1908 to 1932. Information obtained from Mr. Secrest, State Forester.

With the exception of one H. cynosbati bush found infected in the northwestern corner of the State all of the known cluster rust infections occur in the northeastern portion.

The finding of five separate Ribes infections during a short scouting trip in 1931 is probably significant of the presence of undiscussed pine infection in the general vicinities of the infected Ribes. Further scouting in these vicinities would undoubtedly disclose such pine infections.

WHITE PINE FOREST.

Ohio has three areas of white pine. White pine, however, does not exist in pure stands excepting the plantations that have been established by artificial means.

"We have what is known as the Little Beaver area, Columbiana County; the Mahoning area in Ashland and Knox Counties and the Little Mountain area in Lake County. These are all native stands but the trees are scattering with the exception of the Mahoning district and the Little Mountain district which contain considerable percentages of white pine." (From a letter dated April 18, 1932 from Edmund Seeger, State Forester to Pierce.)

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Table No. 43.

Acreage of white pine in Ohio, 1932.
(From Edmund Seeger, State Forester, 1932.)

Ownership	Planted	Native	Total
:	:	:	:
State	231	200	1031
County	139	-	139
Private	748	22,981	23,709
Totals	1,118	23,181	24,299

In Table No. 44 is shown the number of white pine plantations and the number of white pines planted with trees supplied from the State nurseries from 1908 to 1932. Information obtained from Mr. Seeger, State Forester.

Table No. 44.

Number of Plantations of White Pine Originating in
State Nurseries. Ohio - 1908 to 1932.

: Year :	No. of	:No. W.P.:	No. of W.P. per Plantation			:
:Planted:	Plantations:	Planted :	Average	: Maximum	: Minimum	:
: 1908 :	1	: 2000:	2000	: 2000	: 2000	:
: 1909 :	3	: 3418:	1139	: 1218	: 1000	:
: 1910 :	3	: 2200:	733	: 1200	: 500	:
: 1911 :	3	: 4700:	1567	: 2250	: 1000	:
: 1912 :	3	: 2100:	700	: 800	: 500	:
: 1913 :	4	: 8400:	2100	: 3500	: 500	:
: 1914 :	8	: 15250:	1906	: 10000	: 500	:
: 1915 :	8	: 14050:	1756	: 5100	: 350	:
: 1916 :	7	: 8700:	1243	: 5100	: 300	:
: 1917 :	10	: 45610:	4561	: 18500	: 300	:
: 1918 :	7	: 31500:	4500	: 18500	: 200	:
: 1919 :	6	: 9050:	1508	: 5600	: 200	:
: 1920 :	3	: 4700:	1567	: 2500	: 200	:
: 1921 :	7	: 3050:	436	: 1000	: 100	:
: 1922 :	48	: 21300:	444	: 5000	: 100	:
: 1923 :	1	: 700:	700	: 700	: 700	:
: 1924 :	3	: 1200:	400	: 500	: 200	:
: 1925 :	2	: 2600:	1300	: 2000	: 600	:
: 1926 :	114	: 66180:	581	: 10900	: 100	:
: 1927 :	208	: 436735:	2100	: 50000	: 100	:
: 1928 :	30	: 25950:	865	: 5000	: 100	:
: 1929 :	186	: 140325:	754	: 14000	: 50	:
: 1930 :	77	: 67730:	880	: 10000	: 100	:
: 1931 :	105	: 94475:	900	: 10000	: 100	:
: 1932 :	70	: 131750:	1882	: 23500	: 50	:
:All Yrs:	917	: 1143673:	1247	: 50000	: 50	:

Number of Plantations of White Pine Originating in
State Nurseries, Ohio - 1908 to 1932.

Year :	No. of Plantations :	No. of Plants :	Average No. of Plants per Acres :	Minimum No. of Plants per Acres :	Maximum No. of Plants per Acres :
1908 :	1	3000 :	3000 :	3000 :	3000 :
1909 :	3	3418 :	1139 :	1218 :	1000 :
1910 :	3	3300 :	1100 :	1200 :	800 :
1911 :	3	4700 :	1567 :	3250 :	1000 :
1912 :	3	3100 :	1033 :	800 :	500 :
1913 :	4	8400 :	2100 :	3500 :	500 :
1914 :	3	12250 :	1908 :	10000 :	500 :
1915 :	3	14080 :	1738 :	5100 :	350 :
1916 :	7	8700 :	1243 :	1100 :	300 :
1917 :	10	42810 :	4281 :	13800 :	300 :
1918 :	7	31500 :	4500 :	18500 :	500 :
1919 :	6	30500 :	1508 :	5900 :	500 :
1920 :	3	4700 :	1567 :	2500 :	300 :
1921 :	7	3050 :	436 :	1000 :	100 :
1922 :	48	31500 :	444 :	5000 :	100 :
1923 :	1	700 :	700 :	700 :	700 :
1924 :	3	1500 :	500 :	500 :	500 :
1925 :	3	3800 :	1267 :	3000 :	800 :
1926 :	114	88180 :	773 :	10800 :	100 :
1927 :	308	438735 :	1425 :	20000 :	100 :
1928 :	30	32380 :	1079 :	2000 :	100 :
1929 :	186	140325 :	754 :	14000 :	50 :
1930 :	77	57750 :	750 :	10000 :	100 :
1931 :	102	84475 :	828 :	10000 :	100 :
1932 :	70	131750 :	1882 :	33500 :	50 :
All Yrs :	917	1148873 :	1247 :	50000 :	50 :

It may be noted in Table No. 44 that white pine plantings in the State received a decided impetus from 1926 on, approximately 86% of all plantations being established from 1926 to 1932 inclusive. In 1927 the largest number of white pine plantations was established.

There were also the largest maximum number of trees per plantation from 1926 on. These larger plantations were for the most part established on State, County or municipal land.

In Table No. 45 there is shown the calculated acreage necessary to work to protect these plantations.

Table No. 45.

Calculated Acreage Necessary to Work to Protect White Pine Plantations Originating in State Nurseries. Ohio, 1932.

:Average Size :of Plantations: :(Acres)	:Acreage Nec. :to cover for :Ribes to prot: :1 plantation.:	:Number of :Plantations:	:Total Acres :of :Pine Planta- :tions	:Tot.acres to: :be covered :for Ribes to: :prot. Pine :Plantations	:No.of Acres :to work to :prot. 1 :acre of pine:
:Less than 1 (1/3):	: 67	: 615	: 205	: 41205	: 201
: 1	: 75	: 163	: 163	: 12225	: 75
: 2	: 82	: 54	: 108	: 4428	: 41
: 3	: 88	: 19	: 57	: 1672	: 29
: 4	: 93	: 8	: 32	: 744	: 23
: 5	: 98	: 21	: 105	: 2058	: 20
: 6	: 102	: 6	: 36	: 612	: 17
: 7	: 106	: 1	: 7	: 106	: 15
: 8	: 110	: 1	: 8	: 110	: 14
: 10	: 117	: 12	: 120	: 1404	: 12
: 11	: 120	: 1	: 11	: 120	: 11
: 12	: 123	: 1	: 12	: 123	: 10
: 13	: 126	: 2	: 26	: 252	: 10
: 14	: 129	: 1	: 14	: 129	: 9
: 15	: 133	: 1	: 15	: 133	: 9
: 18	: 141	: 1	: 18	: 141	: 8
: 19	: 144	: 2	: 38	: 288	: 8
: 20	: 147	: 1	: 20	: 147	: 7
: 22	: 152	: 1	: 22	: 152	: 7
: 23	: 155	: 1	: 23	: 155	: 7
: 24	: 157	: 1	: 24	: 157	: 7
: 25	: 160	: 2	: 50	: 320	: 6
: 30	: 172	: 1	: 30	: 172	: 6
: 50	: 217	: 1	: 50	: 217	: 4
: Totals	:	: 917	: 1194	: 67070	: 56

There were also the largest maximum number of trees per plantation from 1930 on. These larger plantations were for the most part established on State, County or municipal land.

Table 10. 24.

Plantations Originating in State Nurseries, Ohio, 1922.

[illegible]

Based on the protective zone of 900 feet around each plantation it is calculated that it will be necessary that Ribes-free conditions be established on 67,070 acres in order to protect approximately 1200 acres of pine. This amounts to an average of 56 acres to work to protect one acre of pine. This high ratio is chiefly brought about by the large number of plantations less than an acre in size. It is believed, however, that a high proportion of the protection areas are cultivated fields and Ribes-free.

PRE-ERADICATION SURVEY.

In late October Putnam made a preliminary survey of the work necessary to protect the white pine in the arboretum at Wooster. This will be a comparatively easy job requiring a few men for a few days only.

Accompanied by Assistant Forester Paton, Putnam made a very superficial examination of the 800 acres of native white pine and hardwoods on the Clear Creek State Forest. Ribes conditions were only medium and it is believed that this forest could be protected without a great outlay of labor.

State Forester Secrest expressed the desire to have these areas protected and a willingness to furnish the labor to do so if the Federal Government would furnish the supervision.

NURSERY SANITATION.

According to the "Forestry Almanac" for 1933 there are three State nurseries with a total area of 67 acres and 19,000,000 trees. The principal trees planted are red, Scotch, short leaf, white and Corsican pine; Norway spruce; European larch; black walnut; white ash; locust; red oak and tulip poplar. Two of these nurseries are in the southern portion of the State and one is in the northern portion at Wooster. Mr. Secrest expressed the desire to have an estimate made of the work necessary to put these nurseries in a sanitary condition.

COST.

The costs are those incident to Putnam's two day trip in Ohio as follows: Salary \$17.69, Expenses \$6.39 or a total of \$24.08.

SUMMARY AND CONCLUSIONS.

No known pine infection has been found in Ohio except those found in the nurseries in the early days of scouting. These pines originated in France or infected nurseries in other states and wherever possible the entire shipments were destroyed. Ribes infection was found in 1931 during a short scouting trip at four points in the extreme northeastern portion and at one point in the northwestern. It is very probable that a certain amount of pine infection is present in these regions.

Based on the protective zone of 900 feet around each plantation it is calculated that it will be necessary that Ribes-free conditions be established on 67,070 acres in order to protect approximately 1200 acres of pine. This amounts to an average of 56 acres to work to protect one acre of pine. This high ratio is chiefly brought about by the large number of plantations less than an acre in size. It is believed, however, that a high proportion of the protection areas are cultivated fields and Ribes-free.

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In late October Putnam made a preliminary survey of the work necessary to protect the white pine in the arborvitae at Wooster. This will be a comparatively easy job requiring a few men for a few days only.

Accompanied by Assistant Forester Faxon, Putnam made a very superficial examination of the 800 acres of native white pine and hardwoods on the Clear Creek State Forest. Ribes conditions were only medium and it is believed that this forest could be protected without a great outlay of labor.

State Forester Geesert expressed the desire to have these areas protected and a willingness to furnish the labor to do so if the Federal Government would furnish the supervision.

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According to the "Forestry Almanac" for 1923 there are three State nurseries with a total area of 67 acres and 19,000,000 trees. The principal trees planted are red, Scotch, short leaf, white and Corsican pine; Norway spruce; European larch; black walnut; white ash; locust; red oak and tulip poplar. Two of these nurseries are in the southern portion of the State and one is in the northern portion at Wooster. Mr. Geesert expressed the desire to have an estimate made of the work necessary to put these nurseries in a sanitary condition.

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Particularly since 1926 white pine has been planted extensively in the State as forest plantations. There are also present good native stands of white pine mixed with hardwoods. There are three State nurseries producing white pine for reforestation purposes.

No Ribes eradication work has been done in the State. However, the State Forester has expressed the desire to cooperate with the Federal Government in instituting a control program. A blaster rust control State leader could be well occupied on a year round basis in scouting for the rust, sanitation work around nurseries and protection of native and planted stands. With the rust known to be present in the northern part of the State, in Pennsylvania, New York and Michigan it is only a question of time before it reaches the white pine growing areas in the State and does damage. A systematic control program before this happens would prevent any blaster rust damage to pines so protected.

BLISTER RUST CONTROL - INDIANA 1932.

HISTORY OF WORK AND STATUS OF THE RUST.

"The blister rust was found by Benjamin W. Douglass, Indiana State Entomologist, in 1910 on a shipment of white pine from Europe at the Princeton Nursery at Princeton. The whole lot of pines was destroyed at once. No disease has been since found in the state". (Report on White Pine Blister Rust Survey for Indiana 1917 by Roy G. Pierce).

The first blister rust work in Indiana consisted of scouting in 1917 by four Federal men at various times during the summer and tracing shipments of white pine from infected nurseries. Their time amounted to $1\frac{1}{2}$ man months. 744 white pine were examined at 25 inspection points in 15 cities. This inspection included all of the known white pine plantings. No infection was found.

In 1918 scouting for blister rust continued in the State, under the direction of Dr. Homer C. Sampson who cooperated with the State Entomologist. Two Federal scouts assisted in the inspection. A total of 129 inspections were made at which 12,425 pines and 14,859 Ribes were examined. In this scouting work 74 man days were employed at a cost to the Federal Government of \$511.75. No infection was found.

In 1919, 77 man days were spent in scouting by Federal agents at a total cost of \$614.63. 16,728 white pine and 10,874 Ribes, mostly cultivated, were examined at 131 points. No infection was found.

In 1920 blister rust scouting in the State was limited to a few days' inspection at the most likely places. No record is at hand regarding the number of inspections made. The total cost to the Federal Government was \$107.78.

Practically no further blister rust work was done in the State until 1929. "A rust (probably Cronartium ribicola, though never definitely determined as such by the Division of Forest Pathology because the condition of the specimen prevented positive identification), was collected by Mr. R. A. Sheals in northeastern Indiana practically on the Indiana-Ohio line in late October 1929 from the leaves of Ribes nigrum". (From Report on Blister Rust Survey in Indiana for 1931 by R. G. Pierce).

In 1931 Sheals and Pierce made a short scouting trip in northern Indiana and examined Ribes at 22 places. No infection was found. Pierce reports on this work as follows: "Scouting by Sheals and Pierce in August 1931 was confined largely to the northern tier of counties adjacent to Michigan. These counties have had a prolonged dry spell lasting for weeks. A special trip by the writer was made at the request of State Entomologist Frank N. Wallace to the Clarke County Forest, Henryville, in the extreme southern end of Indiana to inspect the State plantations of white pine. No rust was found, either on the auto trip to northern Indiana or on the special trip to Henryville.

HISTORY OF WORK AND STATUS OF THE RUST.

The blister rust was found by Benjamin W. Douglas, Indiana State Entomologist, in 1910 on a shipment of white pine from Europe at the Princeton Nursery at Princeton. The whole lot of pines was destroyed at once. No disease has been found in the state. (Report on White Pine Blister Rust Survey for Indiana 1919 by Roy C. Pierce).

The first blister rust work in Indiana consisted of scouting in 1919 by four Federal men at various times during the summer and tracing shipments of white pine from infected nurseries. Their time amounted to 1 1/2 man months. 744 white pines were examined at 25 inspection points in 15 cities. This inspection included all of the known white pine plantings. No infection was found.

In 1918 scouting for blister rust continued in the State, under the direction of Dr. Homer C. Sampson who cooperated with the State Entomologist. Two Federal scouts assisted in the inspection. A total of 128 inspections were made at which 13,432 pines and 14,859 Ribes were examined. In this scouting work 74 man days were employed at a cost to the Federal Government of \$511.75. No infection was found.

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In 1931 Sheals and Pierce made a short scouting trip in northern Indiana and examined Ribes at 25 places. No infection was found. Pierce reports on this work as follows: "Scouting by Sheals and Pierce in August 1931 was confined largely to the northern tier of counties adjacent to Michigan. These counties have had a prolonged dry spell lasting for weeks. A special trip by the writer was made at the request of State Entomologist Frank W. Wallace to the Clarke County Forest, Henryville, in the extreme southern end of Indiana to inspect the State plantations of white pine. No rust was found, either on the auto trip to northern Indiana or on the special trip to Henryville.

"A former member of this Division, Miss Oma Waters, while on leave from the Department visited the Turkey Run State Park near Marshall in west central Indiana and has reported (Sept. 1) finding currants and gooseberries badly rusted in this park. While she collected specimens for us, they were inadvertently lost by her. It is not known whether the rust was caused by Cronartium ribicola or by some other fungus".

In 1932 no scouting for blister rust was performed except at a few places examined by Putnam during two days spent in the state for the major purpose of conferring with State officials regarding blister rust control. No infection was found.

WHITE PINE ACREAGE.

Very few native stands of white pine exist in Indiana. A few scattered trees occur in the Indiana Dunes State Park and in the Turkey Run State Park. Within recent years, however, white pine has been quite extensively planted with stock from the State nurseries. It is estimated that there are 1,000 acres of native white pine and 700 acres of planted white pine.

The following quotation from the "Thirteenth Annual Report of the Department of Conservation 1931" shows the status of forestry work in the State.

"A significant thing has occurred during the present year. The trend in forestry is towards practicing it rather than preaching it. Educational propaganda to acquaint the public with the necessity of reforestation is being superseded by actual field results.

"Indiana now has a working forest policy. This includes the following activities: Public acquisition of State forest land; a tax classification law to encourage private investment in forest enterprise; a law permitting city and county forests; the operation of State nurseries to supply trees for forest planting. - - -

"Two factors are of tremendous value in carrying out these activities. One is the independent yet closely coordinated organization of the Division of Forestry within the Department of Conservation and its other component divisions. The other factor is fairly good appropriations with which any appreciable program of reforestation must be provided in order to be proportional with the problem it involves. - - -

"One of the most important phases of the forestry program is the public acquisition of State forests by consolidating large areas of forest waste land in a consistent working plan of fire protection, tree planting and woodland improvement if possible."

The acreage of the three State forests in Indiana on September 30, 1931 is as follows:

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"One of the most important phases of the forestry program is the public acquisition of State forests by consolidating large areas of forest waste land in a constant working plan of fire protection, tree planting and woodland improvement if possible."

The acreage of the three State forests in Indiana on September 30, 1931 is as follows:

Clarke County State Forest	5,419 acres
Jackson County State Forest	728 acres
Morgan-Monroe County State Forest	11,024 acres
Total	17,171 acres

The acreage of the twelve principal State Parks on September 30, 1931 was as follows:

Turkey Run State Park	1,150 acres
McCormick Creek Canyon State Park	532 "
Pokagon State Park	727 acres
Clifty Hall State Park	550 "
Muscatatuck State Park	135 "
Indiana Dunes State Park	2,210 "
Spring Mills State Park	1,100 "
Brown County State Park	1,210 "
Shakamak State Park	1,000 "
The Mounds State Park	258 "
Tippicanoe Battle Field	16 "
Nancy Hanks Lincoln Burying Ground	428 "
Total	9,316 "

LOCAL CONTROL.

No Ribes eradication has been performed in Indiana. Many plantations of white pine exist and the establishment of new plantations is actively in progress. It is estimated that 1 million acres of waste and denuded land exist in the state that should be planted. It is believed that if it were possible to station a blister rust agent in Indiana it would be possible to do a great deal of local control work.

NURSERY SANITATION.

White pine is one of the major conifers produced in the three State nurseries and used for reforestation purposes in the State. According to information received from the State Forester's office in November 1932 the following amount of white pine seedlings and transplants are present in the three State Nurseries:

Clarke County State Forest Nursery	3,500,000
Jackson County State Nursery	315,000
Shakamak State Nursery	150,000
Total	3,965,000

In an interview with Jos. F. Kaylor, Assistant State Forester, in November 1932, he expressed a desire to have sanitation work done around these nurseries and it was tentatively agreed that in the spring of 1933 Putnam should visit these nurseries and make pre-eradication surveys and estimates of the amount of work required.

That tree planting is actively done in the State is evidenced by the

Clark County State Forest	5,419 acres
Jackson County State Forest	738 acres
Morgan-Monroe County State Forest	11,024 acres
Total	17,181 acres

The acreage of the twelve principal State Parks on September 30, 1931 was as follows:

Turkey Run State Park	1,150 acres
McGinnick Creek Canyon State Park	532 "
Pokagon State Park	727 acres
Clifty Hill State Park	550 "
Muscatuck State Park	135 "
Indiana Jones State Park	2,210 "
Spring Mills State Park	1,100 "
Brown County State Park	1,210 "
Shakamak State Park	1,000 "
The Islands State Park	258 "
Tippecanoe Battle Field	18 "
Nancy Hanks Lincoln Burial Ground	488 "
Total	9,316 "

LOCAL CONTROL.

No Ribes eradication has been performed in Indiana. Many plantations of white pine exist and the establishment of new plantations is actively in progress. It is estimated that 1 million acres of waste and denuded land exist in the state that should be planted. It is believed that if it were possible to station a blaster trust agent in Indiana it would be possible to do a great deal of local control work.

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Total	3,965,000

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That tree planting is actively done in the State is evidenced by the

following table showing the amount of nursery stock shipped to the classes indicated during the fiscal year ending September 30, 1931:

Table No. 46

Numbers of Trees From State Nurseries Planted in Indiana, 1931.

: Class :	All Trees :	White Pines :
: Farmers and business men :	1,124,907 :	24,955 :
: Strip Coal Operators :	174,600 :	0 :
: State Forests :	608,513 :	20 :
: State Parks :	125,550 :	16,320 :
: State Game Preserves :	500 :	0 :
: Totals :	2,034,070 :	41,295 :

COSTS.

The costs for the small amount of work done in Indiana in 1932 are for Federal Supervision: Salary \$18.33, Expenses \$8.00, making a total of \$26.33.

SUMMARY AND CONCLUSIONS.

The only blister rust ever known in Indiana was in 1910 when an infected pine was found in the Princeton Nursery in a shipment of white pine from Europe. The whole lot of pine was destroyed at once.

Very little native white pine occurs in the State but within recent years white pine has been used extensively in reforestation. Nearly 4,000,000 white pine are being produced at the three State Nurseries. The State Forester is favorably inclined towards sanitation of these nurseries and protection of existing white pine plantations. A blister rust agent's time would be fully occupied in scouting for the rust, giving sanitation to the nurseries and protecting existing white pine plantations.

following table showing the amount of nursery stock shipped to the classes indicated during the fiscal year ending September 30, 1931:

Table No. 46

Numbers of trees from State Nurseries Planted in Indiana, 1931.

Class	All trees	White Pines
State Lands Preserves	500	0
State Parks	125,250	12,320
State Forests	608,212	20
State Coal Operators	174,800	0
Farmers and business men	1,124,907	24,252
Totals	2,034,070	41,322

COSTS.

The costs for the small amount of work done in Indiana in 1932 are for Federal supervision: Salary \$18.32, expenses \$8.00, making a total of \$26.32.

SUMMARY AND CONCLUSIONS.

The only blister rust ever known in Indiana was in 1910 when an infected pine was found in the Trinton nursery in a shipment of white pine from Europe. The whole lot of pine was destroyed at once.

Very little native white pine occurs in the state but within recent years white pine has been used extensively in reforestation. Nearly 4,000,000 white pine are being produced at the three state nurseries. The State Forester is favorably inclined towards sanitation of these nurseries and protection of existing white pine plantations. A blister rust agent's time would be fully occupied in scouting for the rust, giving sanitation to the nurseries and protecting existing white pine plantations.

BLISTER RUST CONTROL - ILLINOIS 1932.

HISTORY OF WORK.

Previous to 1932 blister rust work in Illinois was chiefly confined to scouting for the disease and tracing down shipments of pines from nurseries known to be infected.

No blister rust has ever been found on white pine or Ribes in this State. However, blister rust on German grown white pine at St. Croix Falls and Amery, Wisconsin and Taylors Falls, Minnesota in 1916 was traced to a large forest tree nursery in Illinois which imported the white pine from J. Heims of Halstenbak, Germany in 1908 and 1909.

During 1917 all nurseries handling white pine and all known private plantings of white pine in the State were scouted for blister rust either by agents of the State Nursery Inspector's staff or by one of the five Federal agents. The time of the five men in the State amounted to $5\frac{1}{2}$ man months.

In 1918 approximately $8\frac{1}{2}$ man months were spent in scouting by five Federal agents who were assisted by members of the State Nursery Inspector's staff who contributed about $1\frac{1}{2}$ man months. During this scouting they made inspections at 481 places and examined 124,443 white pine and 361,026 Ribes bushes. No infection was found. The cost to the Federal Government for this scouting was \$1,951.47.

During 1919 three Federal agents scouted for a total of 449 man days at a cost to the Federal Government of \$2,218.84. The State co-operated informally and made numerous inspections in nurseries. 366 inspections were made during which 2,199,975 white pines and 140,874 Ribes were examined. No infection was found.

Practically no further work was done on blister rust control until 1931 when Messrs. Sheals and Pierce made a short scouting trip in the northern part of the State. They inspected Ribes at 25 different places, 7 of which were locations of the cultivated black currant. No infection was found.

ORGANIZATION OF WORK.

For the first time work in Illinois in 1932 was performed under a Memorandum of Understanding, shown following:

HISTORY OF WORK.

Previous to 1932 blister rust work in Illinois was chiefly confined to scouting for the disease and tracing down shipments of pines from nurseries known to be infected.

No blister rust has ever been found on white pine or loblolly in this State. However, blister rust on German grown white pine at St. Croix Falls and Avery, Wisconsin and Taylor Falls, Minnesota in 1916 was traced to a large forest tree nursery in Illinois which imported the white pine from J. Heims of Halstead, Germany in 1908 and 1909.

During 1917 all nurseries handling white pine and all known private plantings of white pine in the State were scouted for blister rust either by agents of the State Nursery Inspector's staff or by one of the five Federal agents. The time of the five men in the State amounted to 5½ man months.

In 1918 approximately 8½ man months were spent in scouting by five Federal agents who were assisted by members of the State Nursery Inspector's staff who contributed about 1½ man months. During this scouting they made inspections at 481 places and examined 184,443 white pine and 381,036 loblolly bushes. No infection was found. The cost to the Federal Government for this scouting was \$1,951.47.

During 1919 three Federal agents scouted for a total of 449 man days at a cost to the Federal Government of \$2,218.84. The State co-operated informally and made numerous inspections in nurseries. 386 inspections were made during which 2,199,975 white pines and 140,874 loblollys were examined. No infection was found.

Practically no further work was done on blister rust control until 1921 when Messrs. Sheals and Pierce made a short scouting trip in the northern part of the State. They inspected loblollys at 25 different places, 7 of which were locations of the cultivated black current. No infection was found.

ORGANIZATION OF WORK.

For the first time work in Illinois in 1932 was performed under a Memorandum of Understanding, shown following:

MEMORANDUM OF UNDERSTANDING
BETWEEN

THE UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF PLANT INDUSTRY, THE
ILLINOIS STATE DEPARTMENT OF PUBLIC WORKS AND BUILDINGS, AND THE ILLINOIS
STATE DEPARTMENT OF AGRICULTURE

Cooperative Work in Controlling White Pine Blister Rust in Illinois.

The object of the cooperative work outlined herein is to provide for scouting and inspection for the white pine blister rust in Illinois and for the application of such methods of eradication or control as may be necessary.

A. The United States Department of Agriculture, Bureau of Plant Industry Agrees:

- (1) To pay the salaries and necessary travel expenses of one or more men for such time as may be necessary to determine the occurrence and limits of the spread of this disease in Illinois, and under the authority of the Illinois State Department of Public Works and Buildings and its cooperators shall cooperate in the eradication or control of the disease wherever found.
- (2) To assume responsibility for technical instruction of employees engaged in these investigations.
- (3) To conduct such experiments and demonstrations as may be desirable for the purpose of securing effective control of the white pine blister rust in Illinois.

B. The Illinois State Department of Public Works and Buildings Agrees:

- (1) To assume the administrative direction of the aforesaid employees of the United States Bureau of Plant Industry.
- (2) To conduct such control activities as may be agreed upon each year by the cooperating parties.
- (3) To prepare an annual report of all blister rust control work performed under the provisions of this memorandum, one copy of which will be delivered to each of the cooperating parties.
- (4) To submit in prescribed form to the United States Bureau of Plant Industry a monthly report of salaries and expenses paid by the State on blister rust control work.
- (5) To have all salary and expense vouchers of temporary employees to be paid out of Federal funds approved by the individual directly in charge of supervising cooperative blister rust control work in the State before being submitted to the United States Bureau of Plant Industry for payment. This individual shall be under appointment as collaborator without compensation in the United States Department of Agriculture. All Federal funds expended in connection with the fiscal regulations of the U. S. Department of Agriculture.

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THE UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF PLANT INDUSTRY, THE
ILLINOIS STATE DEPARTMENT OF PUBLIC WORKS AND BUILDINGS, AND THE ILLINOIS
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Cooperative Work in Controlling White Pine Blister Rust in Illinois.

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the application of such methods of eradication or control as may be necessary.

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the authority of the Illinois State Department of Public Works and
Buildings and its cooperators shall cooperate in the eradication or
control of the disease wherever found.
- (2) To assume responsibility for technical instruction of employees
engaged in these investigations.
- (3) To conduct such experiments and demonstrations as may be desirable
for the purpose of securing effective control of the white pine
blister rust in Illinois.

B. The Illinois State Department of Public Works and Buildings agrees:

- (1) To assume the administrative direction of the aforesaid employees
of the United States Bureau of Plant Industry.
- (2) To conduct such control activities as may be agreed upon each year
by the cooperating parties.
- (3) To prepare an annual report of all blister rust control work per-
formed under the provisions of this memorandum, one copy of which
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- (5) To have all salary and expense vouchers of temporary employees to
be paid out of Federal funds approved by the individual directly
in charge of supervising cooperative blister rust control work in
the State before being submitted to the United States Bureau of
Plant Industry for payment. This individual shall be under appoint-
ment as collaborator without compensation in the United States
Department of Agriculture. All Federal funds expended in connection
with the fiscal regulations of the U. S. Department of Agriculture.

C. The Illinois State Department of Agriculture Agrees:

- (1) To conduct such survey and control activities as may be agreed upon each year by the Cooperating parties.
- (2) To undertake such destruction of white pines or Ribes in Illinois and such enforcement of State laws as may be necessary for the effective prosecution of blister rust control work.
- (3) To deputize and authorize the aforesaid employees of the United States Bureau of Plant Industry to destroy such pines, currants and gooseberries as may be necessary and as provided for by State laws.

D. It is Mutually Agreed:

- (1) That the details of this cooperative work shall be planned and executed jointly by the Bureau of Plant Industry through its Division of Blister Rust Control, the Illinois State Department of Public Works and Buildings and the Illinois State Department of Agriculture.
- (2) That this memorandum of understanding shall take effect July 1, 1932, and continue in effect until June 30, 1933, provided, that any one of the parties may terminate the agreement at any time by a written statement to that effect 30 days in advance of the date of termination desired.
- (3) That all persons appointed by the United States Bureau of Plant Industry and its cooperators under this memorandum shall be satisfactory to the cooperating parties.
- (4) That the results of the cooperative work may be published jointly, or upon mutual agreement, by either cooperating party, with due credit given to the cooperating agencies. All manuscripts therefor, shall be criticised by the cooperating parties before publication and, all form letters, bulletins and any other circulars to be mailed in penalty envelopes shall be submitted in manuscript form for approval by the United States Department of Agriculture before being printed or sent out, in accordance with Postal Law.
- (5) That any expenditures involved in the work herein assumed by the United States Bureau of Plant Industry are contingent upon appropriations made by Congress for continuance of these activities, but no Federal funds shall be expended in compensation for host plants destroyed in control work.
- (6) That for the fiscal year July 1, 1932 to June 30, 1933, the Illinois State Department of Public Works and Buildings and its cooperators will expend about five hundred dollars and the Federal Government in behalf of the United States Bureau of Plant Industry about five hundred dollars in connection with the work herein provided for, provided, however, that the maximum expended by the Federal Government shall not exceed \$1,000.

C. The Illinois State Department of Agriculture Agrees:

(1) To conduct such survey and control activities as may be agreed upon each year by the cooperating parties.

(2) To undertake such destruction of white pines or Ribes in Illinois and such enforcement of State laws as may be necessary for the effective prosecution of blaster root control work.

(3) To deputize and authorize the aforesaid employees of the United States Bureau of Plant Industry to destroy such pines, currants and gooseberries as may be necessary and as provided for by State laws.

D. It is Mutually Agreed:

(1) That the details of this cooperative work shall be planned and executed jointly by the Bureau of Plant Industry through its Division of Blaster Root Control, the Illinois State Department of Public Works and Buildings and the Illinois State Department of Agriculture.

(2) That this memorandum of understanding shall take effect July 1, 1932, and continue in effect until June 30, 1933, provided, that any one of the parties may terminate the agreement at any time by a written statement to that effect 30 days in advance of the date of termination desired.

(3) That all persons appointed by the United States Bureau of Plant Industry and its cooperators under this memorandum shall be satisfactory to the cooperating parties.

(4) That the results of the cooperative work may be published jointly, or upon mutual agreement, by either cooperating party, with due credit given to the cooperating agencies. All manuscripts therefor, shall be criticized by the cooperating parties before publication and, all form letters, bulletins and any other circulars to be mailed in general envelopes shall be submitted in manuscript form for approval by the United States Department of Agriculture before being printed or sent out, in accordance with postal law.

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In witness whereof the parties hereto have severally signed these presents on the respective days and dates hereinafter set forth.

August 26, 1932

(Signed) H. H. CLEAVELAND
Director, Illinois State Department of Public Works
and Buildings.

August 27, 1932

(Signed) STUART PIERSON
Director, Illinois State Department of
Agriculture.

Sept. 19, 1932.

(Signed) W. A. TAYLOR
Chief, Bureau of Plant Industry, U.S. Dept. of Agriculture.

Approved:

Sept. 19, 1932

(Date)

(Signed) A. H. WOODS
Director of Scientific Work

In witness whereof the parties hereto have severally signed these presents on the respective days and dates hereinafter set forth.

August 28, 1932
(Signed) H. E. CLEVELAND
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August 27, 1932
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Director of Scientific Work

WHITE PINE ACREAGE.

"Most of the white pines of the state are in the northern part. The centers of most importance, based on the number of pines planted, are in the Chicago region including Cook, Lake, Kane and Dupage Counties; Harvard, Rockford, Oregon, Dickson, LaSalle and Bloomington. In the southern part of the state the St. Louis and Quincy Regions are the most important.

"In addition to the nursery stock two regions of native white pines in the State deserve some attention. These are the Waukegan region in Lake County and the Stratford (Pines State Park) region in Ogle County. In each of these regions the area of white pine covers approximately one square mile. In the Waukegan region the pines are on low sand ridges near Lake Michigan. Stratford white pines are reproducing abundantly from seed, formerly from a few old trees on the **rock** cliffs along Pine Creek and at present from nearly 40 acres of white pine now about 80 years old."

(From "Pine Blister Rust Survey for Illinois 1918" by Homer C. Sampson)

It is estimated there are approximately 1200 acres of native and 400 acres of planted white pine in the State.

LOCAL CONTROL.

In the late summer of 1932 two Ribes eradication jobs were performed in the State, both near Oregon in Ogle County. One was on Governor Lowden's Estate, the Sinnissippi Farm, and the other at the Pines State Park. The work was supervised and men trained by Putnam. Foremen and labor were furnished by the owners. In Table No. 47 is shown a statement of eradication work done.

Instead of paper red muslin was used to mark the limits of crew work since it was undesirable to leave paper trails on these areas. The strips of red muslin were picked up by the trail maker on his return trip and used over and over again.

Bushes were pulled by the aid of an iron bar about 4 feet long with a handle at one end and a two pronged hook at the other, designed by Mr. H. C. Scott, Park Custodian. Each man was supplied with one of these hooks. On the larger bushes an auto and tow chain proved quite effective in pulling the bushes. At one place on the Sinnissippi Farm, owing to annual flooding and deposition of silt around bushes it was necessary to use a truck and log chain to pull the bushes. In portions of the park along the bluffs the men were lowered by means of rope down the sides of the cliffs in order to reach the gooseberry bushes.

A considerable amount of pulling of gooseberry bushes had been done by Mr. H. C. Scott, custodian of the park, before September. Last spring he cleared many of the large bushes to make a camp site, using horses and a chain.

WHITE PINE FORESTS.

"Most of the white pines of the state are in the northern part. The centers of most importance, based on the number of pines planted, are in the Chicago region including Cook, Lake, Kane and DuPage Counties; Harvard, Rockford, Oregon, Jackson, LaSalle and Bloomington. In the southern part of the state the St. Louis and Quincy regions are the most important.

"In addition to the nursery stock two regions of native white pines in the state deserve some attention. These are the Waukegan region in Lake County and the Starbuck (Pine State Park) region in Ogle County. In each of these regions the area of white pine covers approximately one square mile. In the Waukegan region the pines are on low sand ridges near Lake Michigan. Starbuck white pines are reproducing abundantly from seed, formerly from a few old trees on the rock cliffs along Pine Creek and at present from nearly 40 acres of white pine now about 80 years old."

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Table No. 47

Ribes Eradication in Illinois, 1932.

												:Total :
												:Cost :Acres:
:Project:	of	Type of Work:	Acres:	Ribes :					Ribes:	per	per	:
:	Pine :		Worked:	Pulled:					per	Acre	Man	:
:	Prot.:				Owner:	Federal:	Total:	Acre	Worked:	Day		:
:Sinnis-:	:Crew	:	319	: 92182:	269.10:	a 67.94:	33704:	289.0:	1.06:	2.8	:	:
:sippi :	:Scout	:	800	: 8386:	36.30:	83.74:	12004:	10.5:	0.15:	36.8	:	:
:Farm :	:Ribes Free	:	231	: 0 :	0 :	0 :	0 :	0 :	0 :	0 :	:	:
:	:125	:All Work	: 1350	:100568:	305.40:	151.68:	457.08:	74.5:	0.34:	10.1	:	:
:Pines :	:Crew	:	213	: 99906:	434.00:	18.96:	452.96:	469.0:	2.13:	1.9	:	:
:State :	:Scout	:	259	: 2186:	78.00:	63.20:	14120:	81.4:	0.55:	10.6	:	:
:Park :	:Ribes Free	:	136	: 0 :	0 :	0 :	0 :	0 :	0 :	0 :	:	:
:	:135	:All Work	: 608	:102092:	512.00:	82.16:	594.16:	167.9:	0.98:	4.5	:	:
:	:	:Crew	:	532	:192,088:	703.10:	86.90:	790.00:	361.1:	1.49:	2.4	:
:	:	:Scout	:	1059	: 10572:	114.30:	146.94:	261.2:	10.0:	0.25:	22.9	:
:	:	:Ribes Free	:	367	: 0 :	0 :	0 :	0 :	0 :	0 :	:	:
:	:260	:All Work	: 1958	:202660:	817.40:	233.84:	15124:	103.5:	0.54:	7.3	:	:

- a. Based on a composite cost per man day of \$12.64 composed of salary \$9.04; subsistence \$3.00 and auto travel \$0.60.
- b. Based on labor at 30¢ per hour or ~~\$3.20~~ 2.40 per day.
- c. Based on labor at \$4.00 per day. 2.40

Of the total of 202,660 bushes pulled in Illinois, 202,461 were R. missouriense, 92 were R. americanum, 100 were R. aureum and 7 were R. cynosbati. The 100 R. aureum bushes were growing in a farmer's yard and the owner was compensated by the State with hydrangea bushes.

In addition to the Ribes pulled there were treated with dry chemicals 111 large R. missouriense bushes as an experiment. This work is reported in greater detail under "Investigational Work".

It may be noted that in Table No. 47 on the Sinnissippi Farm it was necessary to cover approximately 11 acres to protect 1 acre of pine. This is because the pines were not planted in solid blocks but were scattered at different places over the estate. Mr. Lowden has planted since 1905 approximately half a million white pine trees.

NURSERY SANITATION.

There are no State nurseries in Illinois. Under the direction of the State Nurserymen's Association trees for roadside beautification are being raised at State expense at some of the public institutions.

There are no private nurseries in the State raising appreciable amounts

Ribes Fraxinifolia in Illinois, 1932.

[illegible]

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greater detail under "Investigational Work".

It may be noted that in Table No. 47 on the Minnesota map it was necessary to cover approximately 11 acres to protect 1 acre of pine. This is because the pines were not planted in solid blocks but were scattered at different places over the estate. Mr. Lowdon has planted since 1905 approximately half a million white pine trees.

NOTATION: YRSTY

There are no state nurseries in Illinois. Under the direction of the State Nurseryman's Association trees for roadside beautification are being raised at state expense at some of the public institutions.

"There are no private nurseries in the State raising appreciable amounts

of white pine. No sanitation work has been performed around any of these nurseries and none have applied for this work chiefly because at the present time Illinois is classified as a non-infected state and hence pine shipping permits are not required. It is believed that since the revision of Federal Quarantine 63, private nurseries are increasing their white pine stock and it may be that certain nurseries will be interested in sanitation work in the near future.

INVESTIGATIVE WORK.

Dry applications of ammonium thiocyanate and sodium chlorate were applied to 111 R. missouriense bushes at the Pines State Park and on the Sinnissippi Farm, in late September 1932. The leaves were one-half to three-quarters gone from the bushes at the time. Chemicals were applied in roughly measured amounts at the base of each clump after the duff had been scraped away. Following application the chemicals were again covered with duff. In Table No. 48 is shown a statement of this work.

Table No. 48.

Application of Dry Chemicals to R. missouriense
Sept. 24 and 30, 1932. Oregon, Illinois.

: Plot :	: Application:	: Lbs. Chem. :
: No. : Chemical : (Pounds) : Bushes : F.L.S. : per 1000 F.L.S. :		
: Pines 1 : Am. thiocyanate:	6.00 : 2 : 3500 :	1.70 :
: Farm 2 : " " :	12.50 : 29 : 5710 :	2.19 :
: Pines 2 : Sod. chlorate :	5.75 : 2 : 2200 :	2.61 :
: Farm 1 : " " :	6.00 : 7 : 1625 :	3.69 :
: Farm 3 : " " :	9.25 : 10 : 3025 :	3.06 :
: Farm 4 : " " :	9.00 : 15 : 2970 :	3.03 :
: Farm 5 : " " :	8.00 : 40 : 4000 :	2.00 :
: Farm 6 : " " :	2.50 : 1 : 1000 :	2.50 :
: Farm 7 : " " :	3.00 : 5 : 4000 :	0.75 :
: Totals : Am. thiocyanate:	18.50 : 31 : 9210 :	2.01 :
: : Sod. chlorate :	43.50 : 80 : 18820 :	2.31 :

INFORMATIONAL ACTIVITIES.

During the course of the Ribes eradication work Mr. Phil S. Haner, Superintendent of the State Division of Plant Industry, and Mr. Smith, publicity man for the State Department of Agriculture, visited the work. As a result Mr. Smith prepared an excellent story of the work for release to all Illinois papers and to a paper in Washington, D.C. Several items on the work came out in Rockford and Oregon papers.

During late September Putnam brought Mr. Geo. E. McClaren, Manager of the Sinnissippi Farm, and Mr. W. R. Jack, one of the nursery inspectors, to the Menominee Indian Reservation in Wisconsin to show them blister rust on both pines and Ribes and also to show them what virgin stands of white pine looked like.

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Dry applications of ammonium thiocyanate and sodium chlorate were applied to 111 R. missouriensis bushes at the Pines State Park and on the Mississippi farm, in late September 1932. The leaves were one-half to three-quarters gone from the bushes at the time. Chemicals were applied in roughly measured amounts at the base of each clump after the duff had been scraped away. Following application the chemicals were again covered with duff. In table No. 48 is shown a statement of this work.

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Pines 1: Am. thiocyanate:	6.00	2	3500	1.70	
Pines 2: " "	12.50	22	5710	2.19	
Pines 3: Sod. chlorate	5.75	2	2200	2.01	
Pines 4: " "	6.00	7	1225	3.69	
Pines 5: " "	8.25	10	3025	3.06	
Pines 6: " "	9.00	15	2270	3.03	
Pines 7: " "	8.00	40	4000	2.00	
Pines 8: " "	2.50	1	1000	2.50	
Pines 9: " "	3.00	5	4000	0.75	
Pines 10: Am. thiocyanate:	18.50	31	9210	2.01	
Pines 11: Sod. chlorate	43.50	80	18820	2.31	

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COSTS.

The cost of blister rust control work done in Illinois in 1932 is shown in Table No. 49.

Table No. 49.

Summary of Expenditures, Illinois. Jan.1 to Dec.31, 1932.

Agency	Supervision	Ribes Eradication	Total
State	Salaries 26.67 Expenses 20.00 Total 46.67	817.40	864.07
Federal	Salaries 94.60 Expenses 48.78 Total 143.38	167.24 66.60 233.84	261.84 115.38 377.22
Grand Total	190.05	1051.24	1241.29

Under "Supervision - State" is shown an estimate of the time and the expense of State men in getting the work started in Illinois, particularly Mr. W. R. Jack, one of the State nursery inspectors.

Under "Supervision - Federal" are included items such as scouting for the rust, conference with State officials, making arrangements for the work, etc.

SUMMARY AND CONCLUSIONS.

No blister rust has ever been found in Illinois. However, it is very probable that if a thorough scouting campaign was put on in the State the rust would be found.

The two largest areas of white pine have now been initially protected.

For the first time the State entered into a written memorandum of understanding with the Bureau of Plant Industry regarding blister rust control work.

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Agency :	Supervision :	Trifoliation :	Pipes :	Total :
Salaries :	28.67 :	817.40 :	844.07 :	
Expenses :	20.00 :	0 :	20.00 :	
Total :	48.67 :	817.40 :	864.07 :	
Salaries :	24.60 :	167.24 :	261.84 :	
Expenses :	48.78 :	66.60 :	115.38 :	
Total :	143.38 :	233.84 :	377.22 :	
Grand Total :	190.05 :	1051.24 :	1241.29 :	

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BLISTER RUST CONTROL - IOWA 1932.

HISTORY OF WORK.

Previous to 1932 blister rust work in Iowa was confined to scouting for the disease and tracing down shipments of pines from nurseries known to be infected.

Work started in the state in 1916 when a survey was carried on by Federal Agents in cooperation with the State Entomologist. No blister rust was found.

In 1917 a more intensive survey was conducted by four different Federal agents in cooperation with the State Entomologist. The total scouting time of the Federal agents amounted to $6\frac{1}{2}$ man months. One blister rust infection was found on Pinus flexilis in a shipment from a Minnesota nursery in 1915 to a farmer in Larchwood, Lyon County, in the extreme northwestern corner of the State. This infected pine was destroyed and steps were taken by the State Entomologist to destroy the other pines in the same lot. The whole state was covered in the survey during which 432 inspections were made in 139 towns.

No blister rust survey was made in Iowa in 1918.

In 1919 blister rust scouting work was carried on by two Federal agents in cooperation with the State Entomologist. The entire state was again covered. Since it was impossible to cover all plantations those less than 25 years of age were given preference. No blister rust was found in the state although 614 white pine plantations, exclusive of nurseries, were examined.

The white pine plantation near Larchwood, Lyon County, which was found to be diseased in 1917 was removed and burned. A second plantation of white pine at Stacyville was voluntarily destroyed in 1918 by the owner.

In addition to the scouting for white pine blister rust in 1917 information was also gathered relative to the species and distribution of native Ribes in the State.

Very little scouting for blister rust was done in Iowa from 1919 until 1929. In 1929 Mr. H. E. Guthrie, Assistant State Entomologist, found one European black currant quite heavily infected in Snyder's Nursery at Center Point in Lynn County in the east central portion of the State. This bush was destroyed shortly after discovery. Later in the fall of 1929, 5 heavily infected cultivated black currants were found at West Union in Fayette County in the northeastern portion of the State and 20 cultivated black currants were found heavily infected in Ames, Iowa in Sawyer County in the center of the State. In the 1929 scouting emphasis was placed on the inspection of the cultivated black currant. Seventy-eight plantings representing a total of 391 cultivated black currants were

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examined.

No scouting was done during 1930.

During 1931 a short scouting trip by Messrs. Sheals and Pierce was confined chiefly to the northeast quarter of the State. No blister rust was found on Ribes in the 35 infection points. However, a blister rust canker, positively identified as such by the Division of Forest Pathology, was found on a pine in the College Nursery at Ames growing within approximately one-third of a mile from the black currants previously destroyed found to be infected in 1929. It is very probable that this single canker was of 1929 origin.

During 1932 a very limited amount of scouting was done. The pines in the Iowa State Nursery at Ames were examined at various times by college authorities. On October 10-12, 1932, 7,660 pines were examined and found free from blister rust. The black currant bushes at West Union found infected in 1929 were again examined in 1932. No infection was found. The vicinity of the infected black currants found in 1929 was also examined and no disease located. Several black currant plantings in Clinton, Iowa were examined in the fall by Messrs. Detwiler and Putnam and found free from blister rust.

WHITE PINE ACREAGE.

Native white pine stands in Iowa are confined to the northeastern quarter of the State where they occur as small isolated stands occupying perhaps 2000 acres. Mr. L. H. Tammel in the bulletin entitled "Iowa State Parks, Vol. I, No. 2, Oct. 1923 Editions 2 and 3" states that native groves of white pine are not infrequent in Allamakee and Winneshiet Counties where they are found along the river courses like the Oneota, Yellow and occasionally along the Mississippi and the Clayton. A good stand of white pine covering approximately 1,000 acres occurs in Dubuque County on Pine Creek about $2\frac{1}{2}$ miles northwest of Luxemburg. This is probably the largest native stand in the state. Seed trees and young white pine occur quite abundantly mixed in with hardwoods. Native white pine groves also are found at various State Parks such as Wildcat Den, Eldora, Steamboat Rock and Back Bone.

White pine is used quite extensively in Iowa as shelter belts. Over a distance of approximately 94 miles in northeastern Iowa a count was made of all coniferous shelterbelts facing on the road covered. A separate count was kept of all shelter belts containing 50% or more by count of white pine. Over this distance there was found a total of 151 coniferous shelter belts of which 47 contained white pine, 50% or more by count in composition. Thus there was slightly over 29% of the coniferous shelter belts composed chiefly of white pine. On the basis studied there were 1.7 coniferous shelter belts per mile and exactly .5 white pine shelter belts per mile.

No facts are at hand regarding the number of white pine shelter belts in Iowa but on the basis studied it may be very roughly calculated that there are about 3,500 white pine shelter belts in the State. Planted

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No scouting was done during 1930.

During 1931 a short scouting trip by Messrs. Sheela and Pierce was confined chiefly to the northeast quarter of the state. No blister rust was found on Ribes in the 35 infection points. However, a blister rust canker, positively identified as such by the Division of Forest Pathology, was found on a pine in the College Nursery at Ames growing within approximately one-third of a mile from the black currants previously destroyed found to be infected in 1929. It is very probable that this single canker was of 1929 origin.

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WHITE PINE ADVANCE.

Native white pine stands in Iowa are confined to the northeastern quarter of the state where they occur as small isolated stands occupying perhaps 2000 acres. Mr. L. H. Tamm in the bulletin entitled "Iowa State Parks, Vol. I, No. 2, Oct. 1923" editions 2 and 3 states that native groves of white pine are not infrequent in Allamakee and Winnebago Counties where they are found along the river courses like the Quocatan, Yellow and occasionally along the Mississippi and the Clayton. A good stand of white pine covering approximately 1,000 acres occurs in Dubuque County on Pine Creek about 2 1/2 miles northwest of Luskburg. This is probably the largest native stand in the state. Seed trees and young white pine occur quite abundantly mixed in with hardwoods. Native white pine groves also are found at various State Parks such as Wilcox Den, Aldora, Steamboat Rock and Back Bone.

White pine is used quite extensively in Iowa as shelter belts. Over a distance of approximately 94 miles in northeastern Iowa a count was made of all coniferous shelterbelts facing on the road covered. A separate count was kept of all shelter belts containing 50% or more by count of white pine. Over this distance there was found a total of 151 coniferous shelter belts of which 47 contained white pine, 50% or more by count in composition. Thus there was slightly over 25% of the coniferous shelter belts composed chiefly of white pine. On the basis studied there were 1.7 coniferous shelter belts per mile and exactly .5 white pine shelter belts per mile.

No facts are at hand regarding the number of white pine shelter belts in Iowa but on the basis studied it may be very roughly estimated that there are about 3,500 white pine shelter belts in the state. Planted

white pine make excellent growth in Iowa. On the Tama Indian Reservation four year old white pine stock was planted in a solid block in 1921. Ten consecutive white pine in a row chosen at random were measured by Putnam in October 1932. The average height growth of these ten trees was 22.4 feet high, an average of approximately 2 feet in height per year. Several measurements of four feet were recorded on individual trees in a single year.

It is estimated there are approximately 400 acres of planted white pine in the State.

LOCAL CONTROL.

The only local control performed in Iowa was done in early June at the town of McGregor on the Mississippi in northeastern Iowa on an area in town owned by the U. S. Biological Survey. The work of eradication was done by Junior Forester Miller and three assistants who spent one day in removing wild Ribes for a distance of 900 feet from two large white pine trees covering about 50 acres. They pulled 2,000 Ribes (estimated), mostly R. missouriense with a few R. americanum. Miller also made a checkup for cultivated black currants in the town but found none.

The Ribes eradication work was occasioned by the finding in early April of two suspected blister rust cankers on one of the large white pine trees on growth 25 to 30 years old by Miller. These suspected cankers were cut off and burned. Miller stated that the growth beyond the injury had been killed. No signs of aecia but a constriction was present at the center of each canker.

Ritter and Putnam examined these trees in late June 1932 but failed to find any other signs of blister rust. They also checked on the Ribes eradication work and although thousands of sprouts and seedlings were present no old bushes were found that were missed by the crew. Miller stated that he intended to rework this area in the spring of 1933. In the fall of 1932 Putnam again examined the area for blister rust on Ribes and pines but found none.

NURSERY SANITATION.

The only state nursery is located at Ames, Iowa. An agreement with the Nurserymen's Association allows the state to establish one demonstration shelter belt per township. The State Forester is hoping to put this plan into effect and use chiefly white pine. If this is done each owner of such a demonstration shelter belt in which white pine will be planted must agree to clean up his area of Ribes. No nursery sanitation work has been done at Ames. The plan of moving the state nursery to an area farther from houses and cultivated Ribes is being considered.

At the request of the Earl Ferris Nursery at Hampton, Iowa a pre-eradication survey and a small amount of Ribes eradication work was

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Table No. 50.
Sanitation Work at Ferris Nursery,
Hampton, Iowa. Oct. 17-18, 1932.

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*Bushes at 2 locations will be taken out and owners given other nursery stock from Ferris Nursery.

[illegible]

1. Money for white glass bottles 2400

Table No. 51.

7. Giving correct advice in the evening and collection of water

-98-

The item under "Supervision" covers all of Putnam's activities not itemized under the other headings. It includes such items as scouting for the rust, conferences with State Officials, making plans for future work in Iowa, etc.

SUMMARY AND CONCLUSIONS.

Blister rust was first found in Iowa in 1917 when an infected P. flexilis from an infected nursery in Minnesota was found in the extreme northwestern corner of the state. This pine and the entire shipment was destroyed and no blister rust has been found there since. In 1929 infection was found in three places on cultivated black currants, namely; Ames, Center Point and West Union. In 1931 one infected pine was found in the college nursery at Ames, apparently originating from the cultivated black currant infection in 1929. In April 1932 at McGregor, Iowa a suspected infection on white pine was found. These two suspected cankers were destroyed before they were positively identified as blister rust.

Actual blister rust control in Iowa has been limited to Ribes eradication on about 50 acres in McGregor, Iowa and the beginning of nursery sanitation work around the Earl Ferris Nursery in Hampton, Iowa.

There is little native white pine in the state. What there is is chiefly confined to the northeast corner. White pine is extensively used in shelter belts. A blister rust control program would be largely centered around their protection.

A blister rust control leader in Iowa could well be employed. Among his activities would be listed the following:

1. Scout for white pine blister rust.
2. Control work and advisory work in connection with demonstration white pine shelter belts.
3. Sanitation and inspection of nurseries desiring to grow white pine.
4. Protection of existing white pine plantations and native white pine stands.
5. Protection and advice concerning existing white pine shelter belts.
6. Cultivated black currant eradication campaigns.
7. Giving general advice on the growing and cultivation of white pine.

The item under "Supervision" covers all of Patnam's activities not itemized under the other headings. It includes such items as accounting for the trust, conferences with State Officials, making plans for future work in Iowa, etc.

APPENDIX A - CONCLUSIONS

Blighter rust was first found in Iowa in 1917 when an infected *P. flexilis* from an infected nursery in Minnesota was found in the extreme northwestern corner of the state. This pine and the entire shipment was destroyed and no blighter rust has been found there since. In 1929 infection was found in three places on cultivated black currants, namely: Ames, Center Point and East Union. In 1931 one infected pine was found in the college nursery at Ames, apparently originating from the cultivated black currant infection in 1929. In April 1932 at McGregor, Iowa a suspected infection on white pine was found. These two suspected cankers were destroyed before they were positively identified as blighter rust.

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7. Giving general advice on the growing and cultivation of white pine.

REPORT OF PROGRESS MADE IN 1932 ON INVESTIGATIONAL WORK

Investigational work is being conducted in the Eastern District by the Division of Blister Rust Control to add to the information on which the practical control of this disease is based, so that wider, more effective, and more economical control may be realized and maintained.

Blister rust control was founded on pathological research. Control methods were developed from theories by practical experiments conducted under the pressure of imminent large losses to our forest resources. The rapid spread of the destructive blister rust did not permit concentration on the experimental refinement of these methods of local control. The threatened loss of white pine forced their immediate application on a large scale work which, while still considered experimental, was chiefly directed to halt the further inroads of the disease on valuable pine areas. Refinements have come largely by the trial and error route, although several long term investigations were started early in the control campaign. Now that the initial protection of the Eastern pine stands is nearing completion, more attention can be given to the achievement of those refinements in methods which may come from more detailed study of the disease and its hosts. The refinements will have their chief application in the East in permitting more economical maintenance of control.

The necessity for concentration on application of control measures has prevented until recently the organization of a definite investigational unit. Studies have been conducted as sidelines by the force regularly engaged in the widely different duties of administration, extension and eradication. The larger studies, ^{and} at times even the long-term investigations have been assigned to temporary employees or temporarily to permanent employees. No one individual was available for the actual direction of all this investigational work. Necessity forced the disregard of the inefficiency of this arrangement until last spring, when the writer was put in charge of investigational work in the Eastern District.

Only two full-time employees are assigned to investigational work as their chief task, Mr. H.J. Ninman and the writer. Ninman's chief task is the conduct of the long-term investigations at Eau Galle, Wis., while the writer has been most closely associated with the long-term investigations at North Hudson, N.Y., and Ribes ecology studies near Warrensburg, N.Y. Temporary workers employed during the calendar year 1932 were: Dr. R.R. Hirt, on full time for about 4 summer months and w.a.e. basis the rest of the year, in immediate charge of the Pack Forest (Warrensburg, N.Y.) infection experiments started by Dr. Pennington in 1927; J. L. Lowe and R.A. Darrow, each employed full time for three summer months to assist Dr. Hirt; Mark Plunguian, employed full time for nearly four months last summer to conduct chemical eradication experiments; local laborers employed for a few days each as needed for the assistance of Dr. Hirt and Plunguian; G.E. Draper, of Barberry Eradication, who was transferred to Blister Rust Control for six days to conduct chemical eradication experiments in Wisconsin; and four laborers each employed for several days as Draper's assistants.

In addition to the work done by the above men employed entirely on investigations, a considerable proportion of the field men engaged primarily in administrative or control activities performed investigational work during the year. Field men known to have engaged voluntarily in two or more investigational projects during 1932 include Putnam, Swain, Brockway, Clave, Kouba, Ritter, Doore, Fatzinger, Riley, and Rose. At least eight other field men worked on one study each during the year. This indicates a healthy condition for the blister rust control organization, the desire to acquire more information and contribute it to the solution of the general problem.

The expression of this desire in numerous and widely different studies and experiments by nearly two dozen field men largely lacking the training, experience, or temperament best suited for detailed investigational work, men who can not give undivided attention to such work because of their primary duties, and who are scattered over a dozen states, presents a considerable problem in the matter of organization and direction of these investigational activities so that the greatest benefit will come of them. The first step of such organization would logically be the taking of an inventory of all past investigational work, so that future work can build more closely on the results of work done and with less duplication of effort. However, it would be impracticable to call a halt to all such work until this very considerable task is completed; therefore, the current activities must be adequately directed and supervised while an inventory is being taken. The organization of investigational work, therefore, aims concurrently at these objectives:-

1. Continue and increase the active interest of field workers in observation, investigation and experimentation.
2. Secure the preparation of adequate detailed plans before studies or experiments are undertaken.
3. Increase as far as practicable the uniformity and simplicity of terminology, procedures, and data forms.
4. Adequately supervise investigational projects to insure their completion and the publication of results.
5. Complete and make available an inventory of all past investigational work. As far as practicable this includes the completion of summary and analysis of data of terminated but incompleated projects, and the publication of results. It includes also the preparation of monographs on certain divisions of the subject matter, such, as, for example, on chemical eradication of Ribes.

The investigational work performed in the calendar year 1932 is reported under various headings. Undoubtedly some projects were worked on by field men without the writer's knowledge, and are therefore not included in this report. Studies made more or less independently by

the Forest Investigation branch of the New York State Conservation Department under the direction of Mr. E.W. Littlefield of that Department, are included only for the sake of completing the picture of Eastern blister rust control investigations.

General Work

During 1932 a field survey of the needs and possibilities along investigational lines was made by the writer through visits to agents or leaders in New York, Maine, Vermont, New Hampshire, Massachusetts, and Connecticut. There is special need for information on the effectiveness of Ribes eradication in controlling the spread of the disease, and on Ribes ecology as an aid to maintenance of control. While chemical eradication tests should be continued in the East and aimed at the selection of the most effective and economical Ribicide, the determination of the lowest efficient quantities per unit of area or of Ribes live stem, and the reduction of application costs, the writer is of the opinion that few proposed control areas in the region have Ribes concentrations that can not be more effectively and economically eradicated by hand. Increasing the speed of eradication crews with the object of locating only the readily-visible bushes, and reducing the period between original work and reeradication, is a formula for decreasing cost that has considerable promise and should be further investigated. The salvaging of heavily infected plantations by pruning that will also increase ultimate quality of the lumber produced, also promises to be practicable.

A plan was prepared for Mr. Filler as a guide for the agent in determining need for reeradication, based on results of ecology studies.

A list of forest management practices aiding in the control of blister rust was prepared and revised on several occasions.

Complete plans were prepared for the pine salvage experiments in Pennsylvania, and the proposed effectiveness of eradication tests on Mt. Desert Island, Me.

Many other miscellaneous activities were engaged in, including collection of Ribes fruits and of blister rust cankers for exhibit purposes, the writing of articles for the Blister Rust News, the assistance of Agent Woodward on several occasions, the taking of photographs, the planning of new experiments, the criticism of manuscripts, the assistance and supervision of Dr. Hirt, Plunguian, and Ninman, work on leases, auto bids, and other routine matters, the attention to correspondence, etc.

Ribes Ecology.

Very little was done on the Warren County Ribes ecology project because no one was available to assign definitely to that work. Several plots that could be rechecked by one individual were attended to by the writer. Results of the few observations made have not been summarized as yet.

At Eau Galle, Wis., Mr. Ninman made a very thorough reexamination and remeasurement of all the plots. In the office, ^{he} has made progress in the summary of these data. Several reports or short papers based on these data have been worked on. It is planned to publish in the Blister Rust News most of the results of these investigations, to avoid further delay in making them available.

Pack Forest Infection Experiments.

Work Done.

Exposure of white pines in a garden of Ribes nigrum for 12-hour periods was continued throughout the 1932 infection season. While pinus strobus was the main species used, seven other white pines (P. monticola, peuce, lambertiana, aristata, flexilis, strobiformis, and excelsa) were exposed for 12-hour periods in smaller lots and over only a portion of the infection season. Pines were exposed at the ground level and at a higher level, above the currant foliage. A part of the exposed trees were kept in a damp chamber for 48 hours immediately following exposure before out-planting, but the majority were out planted immediately following exposure. Data were obtained on the foliage volume of the pines exposed.

Another series of the eight species of white pines listed above, and in addition, P. cembra, was exposed at the edges of the Ribes nigrum garden for the entire season before being outplanted.

An attempt was made to keep teliospore-bearing Ribes nigrum in the garden at all times during the season by addition of diseased bushes from a reserve supply obtained in a Tupper Lake swamp. Ribes leaves were periodically counted, examined, and tested in order to obtain a running record of the comparative sporidia production of the Ribes garden throughout the season. An attempt was made to obtain comparable sporidia-production records by means of an asperator set in the Ribes garden.

Detailed weather records were taken throughout the season.

The study of periodicity of stomatal movement in P. strobus made in 1931 was duplicated and concluded.

Various measurements of pine leaves and stomata were made to determine distances spore tubes must necessarily grow to reach the inner tissue of the needles.

The influence of hot and dry air and direct sunlight on the viability of teliospores, young basidia, and sporidia was studied.

The hourly rate of cast of sporidia over a 24-hour period was determined, and the distance sporidia were cast from sterigmata was recorded.

The viability of sporidia from fallen Ribes leaves up to three weeks after defoliation was tested.

Studies were continued of the germination of sporidia at various temperatures, and the rate of growth of germ tubes measured.

An experiment was begun to determine the minimum time for needle infection following inoculation.

Measurements of cankers and study of rate of canker growth were continued.

Pines exposed in 1927, 1928, 1929, 1930 and 1931 were reexamined for infections and tree condition.

A study was made of the movement of different aged pine needles during wet weather.

Considerable summary work and analysis was done. An office report on 1931 work was prepared.

Results

Some of the specific observations made or conclusions drawn, tentatively, at least, follow:-

1. Favorable weather for pine infection was apparently scarce during the 1932 season.
2. Temperatures of 50° to 60° F. are most favorable for rapid teliospore germination and sporidia production.
3. Agar-agar was used as a substratum for germination of teliospores and sporidia with very good results.
4. Basidia on teliospores persist throughout hot, dry, sunny days and produce sporidia within $3\frac{1}{2}$ to $4\frac{1}{2}$ hours when placed under favorable conditions for germination.
5. Direct sunlight does not destroy the viability of teliospores nor young basidia on partially germinated teliospores.
6. Sporidia are cast rather uniformly over a period of 24 hours from a given unit of infected leaf area.
7. Sporidia are cast from sterigmata for an average distance of 266 microns in a horizontal direction and a maximum observed distance of 320 microns.
8. Telial columns on Ribes leaves dropped and on the ground remain viable for as much as 3 weeks; 75% were found viable after 7 days, 33% after 11 days, 8 to 16% after 14 days, and 0 to 2% after 21 days.
9. Direct sunlight destroys the viability of sporidia under natural conditions. Hot, dry air during sunny, dry days does not destroy the viability of sporidia, if these are not exposed to direct sunlight.
10. It seems probable that sporidia can be blown long distances on cloudy, dry days, and at night, and remain viable.
11. A majority of the primary sporidia produced secondary sporidia when germinated at any of the temperatures used, from 41° to 70° F.
12. Secondary sporidia germinate to produce true infection tubes under the same conditions that primary sporidia produce secondary sporidia.

The optimum temperature for germination of sporidia seems to be 48° to 60° F.

13. The average distance through a stoma of a needle from the cuticle to the mesophyll tissue was found to be 20.8 microns, based on 206 needles of P. strobus.

14. It seems that a minimum of $12\frac{1}{2}$ hours are necessary from the time a sporidium falls upon a needle for the germ tube to contact the mesophyll tissue by way of a stoma.

15. It appears that the nearer a needle spot is to the base of a needle, the sooner the infection becomes evident in the bark. This would indicate a rather uniform rate of growth of the mycelium through the needle.

16. Infections occurring under natural conditions in 1930 and 1931 were more numerous per linear unit of needles on the year-old foliage than on the current season foliage of P. strobus, monticola, and flexilis.

17. In 1932, the average increase in length of cankers originating in 1931 was 0.676 centimeters per month.

18. A majority of 82 cankers produced pycnidia in the 4th season (first season refers to season of inoculation); that is, when the mycelium had been in the bark for 2+ years.

19. Of the very few cankers producing aeciospores in the entire planting of exposed pines, the majority fruited in the 6th season, or when the mycelium had been in the bark for 4+ years.

20. There does not appear to be any relationship between the compactness of the needles of certain ages in each cluster as influenced by wet weather, and the distribution of amount of infection by needle age.

Future Plans.

The work of exposing pines of various species to infection must be continued through a year of favorable infection conditions, in order to permit full interpretation of existing data as well as provide additional data necessary to the solution of the problem. The growing task of re-examining pines exposed in previous seasons must be performed this coming season to provide results of past season's experiments. Some microscopic and macroscopic studies of Ribes, fungus, and pine can be continued as sideline activities promising of useful information.

Infection Study Plots.

1. R.P. Fatzinger and assistants laid out and examined two infection study plots in Pennsylvania state white pine plantations. His report was reviewed by R.G. Pierce (B.R. News, 16:135). On one plot 83 of the 87 trees present were infected, beginning in 1921, with an average of 52 cankers per infected tree. On the other plot 90% of the 60 trees present

were infected beginning in 1922, with 22 cankers, on the average, per infected tree, as a result of fewer Ribes. In spite of the almost complete infection, each of these areas has possibilities of salvage.

2. J.K. Kroeber and assistants laid out and examined in a preliminary manner a white pine infection experimental and demonstration plot in the Teal Lake infection area near Negaunee, Mich. Plot will be studied next season.

3. J. E. Riley, Jr., and assistants laid out a pair of permanent study plots 0.4 acres in size in Cornwall, Conn. Data were taken on both plots, but Ribes were eradicated from one (plus 900 ft. border) while the other remains untreated as a check. Purpose; (a) Eradication efficiency check, (b) Rate of reestablishment and growth of Ribes following eradication, (c) Rate of killing of white pine by blister rust, (d) Comparison blister rust infection and damage before eradication with that occurring afterward and as between eradicated and uneradicated plots.

4. W.T. Roop reexamined the Crane pine infection plot in Ipswich, Mass., established in 1923, and reported his observations (B.R. News, 16: 225). As of November 22, 1932, of the 143 pines originally present, 48 were rust-free, 81 were dead, and 14 were classed as doomed. For the first time in 10 growing seasons white pine seedlings (3) were seen on the plot. First evidence of Ribes comeback was also found near the plot this year, R. hirtellum along stonewalls.

5. G.S. Doore established an infection study plot in Sheffield, Mass., but complete data are not available. Estimates indicate 50% of trees are infected and most of these have trunk cankers.

6. Wm. Clave reported (B.R. News, 16: 69-70) results of a small study (made in 1931) of blister rust damage to advance reproduction in Templeton, Mass. On a 1/8 acre plot 46 well distributed young pines were found; of these, 40 had been killed by the rust, 4 others were diseased and doomed, and only 2 had escaped infection.

7. L.B. Ritter reported (B.R. News, 16: 114-115) results of a R. nigrum and P. strobus infection study conducted from 1925 to 1929, inclusive, at the Hartley plantation, Duluth, Minn. While the proportion of R. nigrum plants found infected in Duluth in 1925, 1927, 1928, and 1929, was 19.3%, 18.8%, 67.5%, and 62.5%, respectively, the number of trees found infected on a small plot of 108 pines increased from 5 in 1925, and 8 in 1927, to 76 in 1928 and over 100 in 1929.

8. F.H. Rose and A.E. Fivaz reexamined a damage study plot established in 1923 in native white pine in Tunbridge, Vt. The 1932 examination showed a high rate of death from the disease.

9. Dr. Walter Snell (N.Y.S. Conservation Dept.) reexamined eight of his blister rust damage study plots, which show that without protection

promising young white pine stands may be entirely wiped out by the disease, and that timely Ribes eradication is an effective control measure.

10. The N.Y. Conservation Department is conducting intensive studies of two planted areas where the degree of infection is greater than seems warranted by the number, size and species of Ribes known to have been present. In the coming year, this study may be extended with the cooperation of blister rust control agents.

11. The paper by E.C. Filler on the Waterford Infection Area has been finally prepared and is now awaiting publication in the Journal of Agricultural Research, probably in mid summer 1933.

Ribes Susceptibility.

1. More than half of the control agents and State leaders cooperated with Dr. Hahn of Forest Pathology to the extent of planting and periodically examining for infection a block of Viking (Norwegian Red Dutch) currants. The only infection reported occurred on check plants, none was found on a Viking in spite of the 30 or more locations in heavily diseased regions.

2. T.F. Kouba started a small experimental test of the susceptibility of R. alpinum L., which is used as an ornamental in Wisconsin. No infection whatever was secured on six plants situated in a heavy infection center for one season, while the infection occurring on check plants of R. cynosbati L. was so heavy that they became defoliated by mid August. While one season's test is not conclusive, a high resistance to blister rust as compared to other Ribes species in Wisconsin was definitely shown. Kouba reported the season's results in the Blister Rust News, 16:229.

3. R.I. Thompson compared infection on R. hudsonianum with that on associated species, including R. americanum on two sites at National Music Camp, Grand Traverse Co., Mich., and found on both sites R. hudsonianum badly infected with blister rust and no infection on associated Ribes. Thompson reported his findings in the Blister Rust News, 16:231.

Salvage of Diseased White Pine Stands

1. R.P. Fatzinger and associates established two pairs of plots in two widely separated locations in Pennsylvania. The plots sample badly diseased white pine plantations, more than 90% infected before eradication work was done. Each plot was 1/8 acre in size. One plot in each pair was treated (salvage operations) while the other serves as a check plot on which all corresponding data have been taken. The object of salvage is economically to get 200 to 240 final crop trees to survive and produce high grade lumber by pruning lower half of living crown, removing blister rust cankers from upper half of living crown, and girdling over topping or crowding nearby dominants or codominants, from carefully selected final crop trees. Complete data as to cankers, cost, etc. have been taken and it is hoped that this experiment can be continued until the lumber from the salvaged trees is cut, graded, and marketed. Work done was reported by Fatzinger (B.R. News, 16:227-228) and by R.M. May (service Letter, Pa. Dept. F & W., Series 3, No. 491, Nov. 17, 1932).

2. H.W. Holcomb has planned the experimental salvage of a small plantation of young white pines recently infected by clipping off infected branches. The plantation is in Oswego Co., N.Y., and it is probable that the owner will furnish the labor for the test.

3. P.E. Barber directed the experimental eradication of blister rust cankers on the Saratoga Springs Reservation by a State eradication crew foreman and two reservation employees. About 775 acres were systematically covered, locating only 112 diseased trees, 49 of which were dead or doomed and were removed. Sixty-three were pruned of limb cankers, in every case only one per tree. The cost was high. Previous pruning of limbs to a 6 foot height undoubtedly had eliminated many other cankers. Annual checks will be made on trees from which diseased parts were removed.

Occurrence of *R. nigrum* Seedlings.

E. M. Brockway studied and reported (B.R. News, 16:176) the occurrence of seedlings of *R. nigrum*. He visited 62 locations where 1106 *R. nigrum* had been eradicated in 1931. No seedlings were found at 54 locations, and at the remaining 8 locations a total of 19 seedlings were found; 9 of these had been present under the original plants and were missed when the latter were pulled, and 10 were of 1932 germination.

Phenological Records.

1. Wm. Clave (possibly other Agents as well) continued cooperation with the Northeastern Forest Experiment Station in collecting springtime phenological data on a forested plot in Sterling, Mass.

2. The majority of field workers of the Division observed, collected, and reported phenological notes on the disease and its hosts. These data were published in the Blister Rust News as received throughout the season.

Pests Other Than Blister Rust.

1. E. M. Brockway studied 25 white pines badly affected by the so-called needle blight in 1931, and reexamined these trees on three occasions in 1932. At the time of the last inspection all but one had apparently completely recovered and made normal 1932 growth. The one that appears to be dying is on a particularly adverse site. Results were reported in the Blister Rust News, 16:169.

2. E.M. Brockway marked 52 white pine trees defoliated in 1932 by gypsy moth larvae, for the purpose of determining the effect of the attack on subsequent refoliation and tree vigor.

Inoculation of Progency of Disease-Resistant Pine.

Dr. Walter Snell continued his tests of the white pine trees grown from seed of apparently resistant or immune individuals located near the Blood Ribes, Temple, N.H., a heavy infection center. The young trees grown from this seed have been outplanted for several years near Newcomb, N.Y.

and are being artificially inoculated with blister rust. Preliminary results fail to support hope that a resistant strain had been found. A greater number of infections were secured on current season's needles than on year-old needles, an observation directly opposite to those of Hirt and others. The variation of Snell's observation may perhaps be explained by the technique of artificial inoculation used.

Tests of Exotic Species of White Pines.

1. E.W. Littlefield (N.Y. Conservation Dept.) and his associates are continuing the test planting of exotic species of forest trees, including white pines. Plantings are being made (1) in a protected forest area to test the value of the species as forest trees for reforestation in pure stands (perhaps also in mixtures), and (2) in unprotected forest areas to test resistance of species to blister rust damage.

2. The State of Pennsylvania is purchasing P. peuce seed for a test of this somewhat resistant white pine species.

3. The State of New Hampshire has outplanted some P. peuce for testing, and is growing some more in their nursery for future tests.

Extension of Eradication Season.

1. J. W. Charlton engaged in a study of dormant Ribes characteristics distinguishing them from their associates during the dormant season. The purpose is to aid in developing means of locating Ribes after defoliation has occurred.

2. Control workers in New York State tested the efficiency of off-season eradication. The protection of several plantations in Cortland Co. was attempted in the latter part of November, 1931, by the scout method, by a man who is keen on Ribes under all conditions. Nine areas checked the summer of 1932 by a competent man showed numerical efficiency percentages ranging from 36 to 93, and averaging about 50. While results thus far are unsatisfactory, further studies will be made aiming at the extension of the effective control season.

Effectiveness of Control.

All control agents in New York State engaged in cruises of protected white pine plantations to determine the degree of infection before and since eradication. The examinations are conducted by pairs of agents, who systematically inspect every tree in every 2d, 5th or 10th row, depending on the degree of cruise determined desirable for the particular area.

Use of White Pine in Iowa Shelter Belts.

H.N. Putnam took a census of white pine and coniferous shelterbelts in northeastern Iowa as a sideline while traveling between official points. On 94 miles of highway there were found 161 coniferous shelter belts (Minimum requirements: one row, at least 75 feet long, of coniferous trees, on property facing the highway traveled and outside of corporate limits; only

one shelterbelt counted per property). Of these, 47 contained white pine, 50 per cent or more by count in composition. Thus there were found 1.7 coniferous shelterbelts per mile and 0.5 white pine shelterbelts per mile. On this basis there may be 12,000 coniferous shelterbelts on Iowa farms of which 3500 may be composed chiefly of white pine. Ribes were found prevalent in these shelterbelts. Putnam reports these observations in the Blister Rust News, 16:230-231.

White Pine Growth.

1. L. B. Ritter reported (Blister Rust News, 16:80-81) results of the previous summer's study of comparative growth of white pine and four other species planted at St. John's University, Collegeville, Stearns Co., Minn. White pine had made the best showing of the five species planted.

2. H.N. Putnam and R.I. Thompson studied and reported (Blister Rust News, 16:162) the comparative growth of white and Norway pine planted on sand near Greenville in Western Michigan. Norway pine showed more uniform growth than white pine, although the average height was only slightly better than that of white pine (6.2 as compared to 6.0 feet, for all trees, regardless of weeviling) in spite of the adversity of the site for the latter species.

3. H.N. Putnam studied and reported (Blister Rust News, 16:210-211) the comparative growth of planted white and Norway pines on the Tama Indian Reservation in Iowa. Four-year old transplants had been planted in 1921 on deep, rich loam. Excellent growth was shown for both species and while white pine outdistanced Norway in height growth, Norway showed uniformly better diameter growth at this age. Best height growth occurred in the years 1927-1929, inclusive. No evidence of weevil injury was apparent.

4. F.H. Rose studied and reported (Blister Rust News, 17:11) the growth of white pine on a sample plot in a Chester, Vt. plantation 20 years old, originally protected 12 years ago. Trees averaged 5 inches D.B.H., and 30 feet in height. This and other results of the study show that white pine planted on good soil and protected from blister rust is one of our most valuable trees.

Eradication Crew Efficiency.

1. H.N. Putnam, T.F. Kouba, and Atkins studied and reported (Blister Rust News, 16:153-154) the effectiveness of Ribes eradication using foremen from unemployed lists in Wisconsin to supervise owner's labor. Substantial checks on eight properties showed remarkably good eradication had been secured.

2. H.J. Ninman reported on "Why Bushes are Missed" in the Blister Rust News, 16:36, on basis of his Eau Galle Studies.

Chemical Eradication

1. Chemical eradication was one of the most generally emphasized field of investigation during 1932. Because of the interest and activity of this field and because chemical eradication experiments were widely

scattered geographically, as well as in problem, plan, and execution it was thought advisable to concentrate on an inventory of our Eastern experiments and information in this chemical eradication field. The purpose of this stock-taking is to gauge the probable importance of chemical eradication in the East to lay a basis for sound organization and direction of this field of investigation. The writer has spent more time on this problem during 1932, both in the office and the field, than on any other. A written summary of all known Eastern chemical investigations of *Ribes* completed or undertaken is rapidly taking form and probably will be ready for distribution in early spring of 1933. Because of this, details of experiments and results are in most cases omitted in subsequent references to work done in this field during 1932.

2. The most extensive chemical eradication tests made in the East in recent years were inaugurated this summer by Mark Plunguian with the aid of local control agents and laborers employed locally when needed. Nineteen plots, ranging in size from $1/20$ to over 1 acre (mostly $1/10$ acre), were treated in *R. hirtellum* concentrations in Brentwood, Exeter, Epping, and Kensington, N.H. Seventeen plots ranging in size from $1/20$ to $\frac{1}{2}$ acre, were treated in *R. glandulosum* concentrations in Fitzwilliam, N.H. Thirteen plots, from $1/20$ to 1 acre in size (mostly $1/10$ acre), were treated in *R. rotundifolium* concentrations near Boquet or Essex, N.Y. At this location two additional plots were laid out and studied, one was left untreated as a check plot and on the other the *Ribes* were eradicated by hand. Thirteen plots, $\frac{1}{4}$ to $\frac{1}{2}$ acre (mostly $\frac{1}{4}$ acre) in size, were treated in Great Barrington and Monterey, Mass., where concentrations of *R. americanum* occurred. One plot about $1/6$ acre in area was treated in a *Ribes hirtellum* and *glandulosum* swamp near Lakeville, Conn., town of Salisbury. The treatments used included soil application, foliage application, and soil plus foliage application of chemical sprays. On one plot dry calcium chloron was applied. The sprays used were: sodium chlorate 0.45#, 0.9#, 1.4#, 2.0#, and 2.7# per gallon of water, plus 0.003# glue in each case; ammonium thiocyanate 1.0# and 2.0# per gallon of water plus, in each case, 0.003# glue; ammonium thiocyanate 1.0# and 2.0# each to 7 pints water and one pint formaldehyde, plus 0.003# glue; calcium chloron (a proprietary weed killer) 1.0# and 2.0# per gallon of water plus in each case 0.003# glue; and fuel oil 100%, and 50% water suspension plus castile soap $\frac{1}{2}$ of 1% (1.0% of weight of water). The spray was applied with knapsack sprayers. Some *Ribes* data (on sample parts of plots in cases where *Ribes* data not obtained for entire plot) was secured in every case, and time records were kept. The only result to date is the observation that the proprietary weed killer "calcium chloron" is unstable, disagreeable to use, entirely impractical and probably useless as a Ribicide.

3. G.E. Draper (temporarily transferred from Barberry Eradication), with the aid of H.N. Putnam and T.F. Kouba, supervised 4 laborers in the chemical treatment of five areas (0.1 to 0.45 acres in size) at Shawano and Keshena, Wis. *Ribes glandulosum* and *cynosbati* were the species treated, and the treatments used were: sodium chlorate spray 1# per gallon water, plus 0.01% glue; ammonium thiocyanate spray, 1# per gallon water plus 0.01% glue; and calcium chloron applied in solid form to *Ribes* crowns at the rate of $1/3$ ton per acre. On two plots the sodium chlorate solution was used and was sprayed on ground and foliage, while on a third plot it was applied as an aerial spray plus subsurface drench. Ammonium thiocyanate spray was applied on one plot only, to ground and foliage. Cost records

were kept, one main purpose of the experiment being to get information on the probable cost of chemical eradication in the region. The costs ran discouragingly high, from \$20.70 to \$66.40 per acre, but these should not be considered representative of economic possibilities of large scale application.

4. L.B. Ritter and H.N. Putnam tested in June on plots totaling 12 square rods at Lake Vaduais, St. Paul, Minn. the killing effect of various amounts of sodium chlorate and Atlacide as sprays (5, 10, and 20% solutions) drenches, and dry, on R. americanum. In August 90% or greater probable kill of Ribes live stem was indicated on plots treated with 20% sodium chlorate spray, 20% Atlacide spray, 2.5% sodium chlorate soil drench, and Atlacide applied dry at the rate of 4# per square rod. Indicated live stem kills between 75 and 90% were probable on the plot treated with 2.5% Atlacide soil drench, and that with 2# dry sodium chlorate per square rod. Based on these preliminary results, it required approximately 3# per 1,000 feet of live stem of either chemical to effect a 90% or better kill.

5. H.N. Putnam applied either dry ammonium thiocyanate or dry sodium chlorate to crowns of each of 111 bushes or clumps of R. missouriense at two Illinois locations, Pines State Park and Sünmissippi Farms, in September. No results available as yet.

6. Wm. Clave rechecked a number of plots he had chemically treated in previous years. Four of them, on the Otter River State Forest, Mass., were resprayed in September.

7. L.C. Swain mixed a solution of ammonium thiocyanate into sawdust and broadcast the latter over three small plots of R. hirtellum and two of R. glandulosum in May, in Nottingham, and Exeter, N.H. Examination made in July indicated considerable promise for the mixture, on one plot a 100% kill of all vegetation including R. hirtellum seemed assured.

8. L.C. Swain reexamined and recorded data on a number of plots he had previously treated with chemicals. A number of these plots in Exeter, N.H. were destroyed by a severe forest fire on July 25.

9. L.C. Swain and T.J. King applied Diesel oil to a plot of skunk currants in Block 31, Dumbarton, N.H. in May.

10. L.C. Swain applied Diesel oil on three small plots of R. hirtellum in Exeter and Brentwood, N.H., on May 2. All foliage hit by spray seemed dead a couple weeks later, but by mid July some sprouting was observed.

11. G.S. Doore reexamined and recorded data on several of the plots he had chemically treated in previous years.

Cost of Hand Eradication Compared to Chemical.

J. E. Riley directed an experiment by Adams at Lakeville, Conn., aimed at comparing costs of hand and chemical eradication under difficult Connecticut swamp-Ribes conditions. Using data on a plot treated chemically by Mark Plunguian, the chemical eradication cost was acutally \$54.07 per acre on this small area. The minimum cost for a large scale and cost efficient operation was estimated as \$27.84 per acre. Two similar plots nearby in the same swamp were eradicated by a 3-man-and-foreman combination,

one at normal, standard-eradication speed, the other much faster with the object of locating and pulling only the readily visible Ribes. Subsequently, the latter plot was reworked at standard speed to determine the Ribes differential between the two speeds.

The cost of the normal eradication work was at the rate of \$4.89 per acre. The rushed eradication, aimed at readily seen bushes only, using the same crew, cost at the rate of \$1.82 per acre. The latter plot reworked by the same crew at normal speed (cost at rate of \$3.03 per acre) indicated that the rushed eradication removed 75.9% of the bushes and 96.5% of the live stem normally removed at standard speed.

This experiment indicates most interesting economical possibilities of speedier crew movement aimed at readily visible plants, and followed more closely by reeradication work. While the comparative results of chemical vs. hand eradication are not available, the much lower cost of the hand work indicate that under the conditions tested, chemical eradication is not economically practicable in Connecticut.

A.E. Fivaz
A.E. Fivaz, Forester,
In Charge of Investigations,

Washington, D.C.
March 15, 1933.

AEF:cjp
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